THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXIV. No. 867.] LONDON, DECEMBER 23, 1879. [31st Year.] Price 6d.

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See Page 968.

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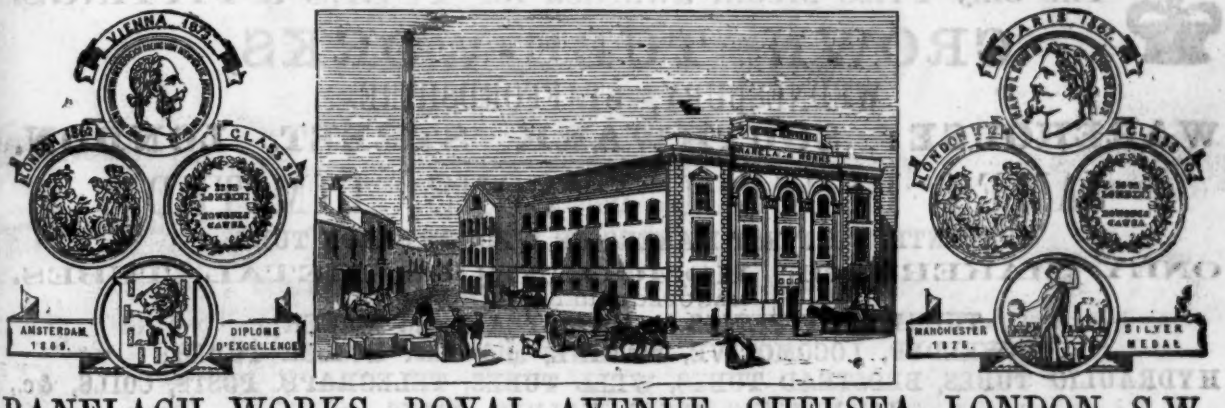

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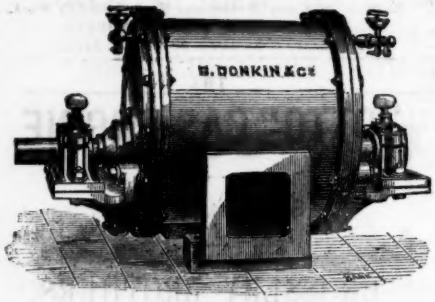

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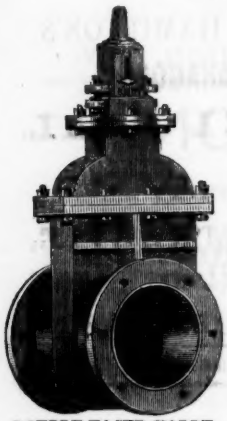
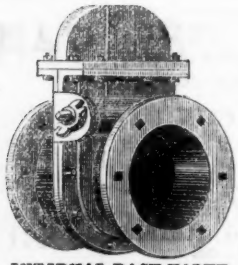
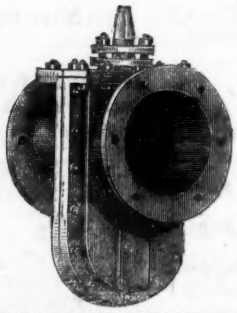


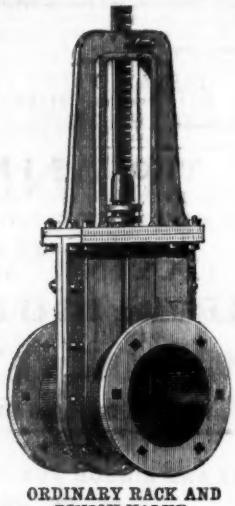
DOUBLE-FACED VALVE SPECIALLY FOR PURIFIERS.



INTERNAL RACK-VALVE WITH STEEL PINION, FOR GENERAL USE.



UNDERGROUND SCREW-VALVE FOR SHALLOW STREET-MAINS.



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In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

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GOLDSMITH'S PATENT SIGHT WATER-LINE INDICATING GAS-METER.
MANUFACTURED BY GUEST AND CHRIMES,

FOUNDRY AND GENERAL BRASS WORKS, ROTHERHAM;

AND 85, SOUTHWARK ST., LONDON, S.E.

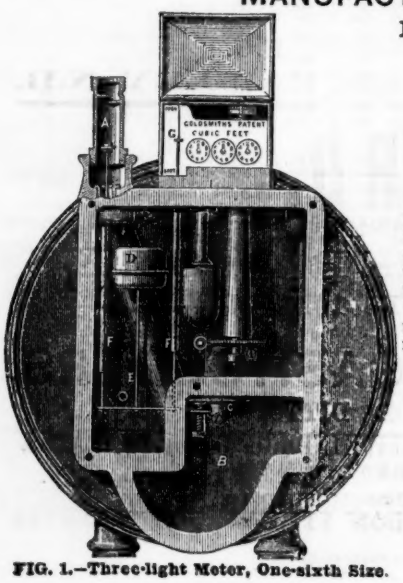


FIG. 1.—Three-light Meter, One-sixth Size.

Fig. 1 is a Meter with front removed to show the arrangement and connection of the Indicator and Valve.

Fig. 2 is front view of Index, with cover up.

The principal object of this invention is to render the water-line in the reservoir at all times visible. It will be seen, by reference to the illustrations, that this is accomplished in the following manner:—On the dial are the words "Open" and "Shut," and attached to the float is the pointer G, which rises and falls with the water-line in the reservoir. If the pointer is at "Open," it shows that the valve is open, and that the reservoir is full. If it is at "Shut," it shows that the reservoir is empty, and that the gas will be shut off.

The following ADVANTAGES will be obvious:—

1. The Inspector can see at a glance if the Meter requires water.
2. No more water than is required need be added, and therefore no water has to run out.
3. The Meter Inspector will be spared a great deal of his most objectionable work, and he will save a great deal of time and trouble.
4. The consumer will not always have to be asked for water, nor will he have to endure the unpleasant smell caused by waste water being run out.

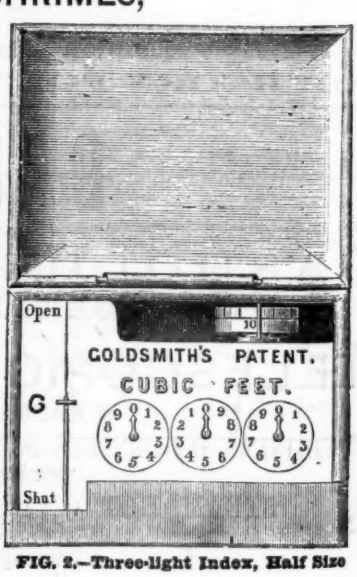
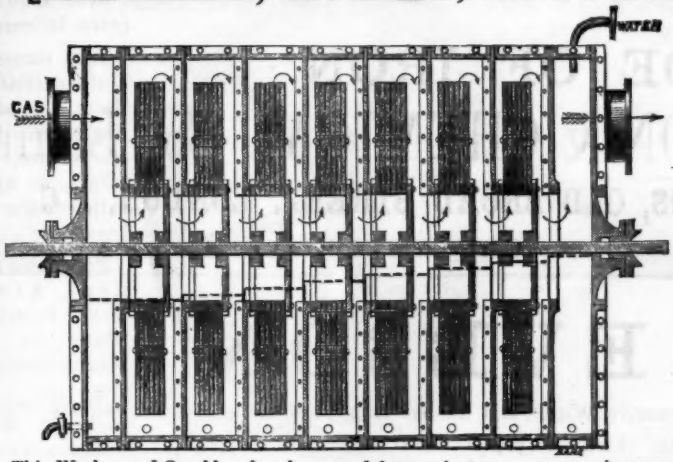


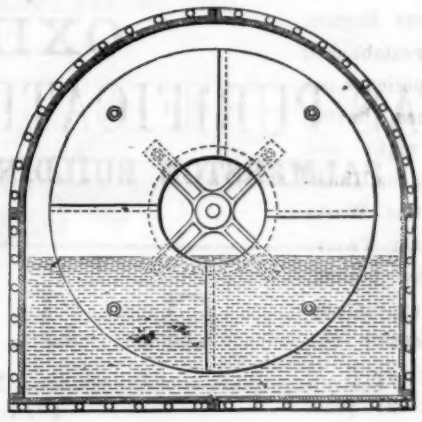
FIG. 2.—Three-light Index, Half Size

THE

"STANDARD" WASHER & SCRUBBER.

[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]





This Washer and Scrubber has been used for nearly two years on a large scale at the Works of The Gaslight and Coke Company, Bromley-by-Bow, at which station there are now several in operation and in course of construction. There is also one in use at the Pancras Station, King's Cross of the same Company, which is purifying 1,500,000 cubic feet of gas per day. At the Gas-Works of the Corporation of Leeds, a large one has been erected, which is giving complete satisfaction. The Special Merits of this Washer are as follows:—

That it is a very effective Condenser, so that it is not absolutely necessary to reduce the temperature of the gas to 60°, or thereabouts, to make the Washer effective. That the distribution of the liquor is made with unerring regularity. That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather. That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided. That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas. That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured. That it is much cheaper than any other Scrubber that will do the same amount of work effectually. That it is the only Washer suitable for purifying Gas from all its impurities by solution. That it works with a minimum of pressure. That it takes out every trace of Ammonia from the Gas in once traversing the machine. That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

D. HULETT, Esq. *The Gaslight and Coke Company, Bromley-by-Bow, May 3, 1877.*

Dear Sir,—In answer to your inquiries respecting the results of the working of your Patent Washer, I beg to state that I find it a very efficient machine. I have had it in operation for some time, and passed gas through it continuously at the rate of 100,000 cubic feet per hour, and obtained from it 11 gallons of 10 oz. liquor per ton of coal carbonized—results which appear to me very satisfactory for so small a Washer. It works very smoothly, taking but little power, and giving no pressure. I have it still in operation, and am perfectly satisfied with its working.

I am, dear Sir, yours truly, (Signed) W. B. WRIGHT.

Messrs. KIRKHAM, HULETT, and CHANDLER. *The Leeds Corporation Gas-Works, York Street, Leeds, Dec. 6, 1878.*

Gentlemen,—The Scrubber-Washer erected by you at these works, and which has been in use for six months, has proved to be, so far as we have been able to test it, thoroughly efficient. We are at present making 32,000 feet of gas per hour, and are entirely dependent on this apparatus for the removal of Ammonia, and the **Gas is perfectly free from that impurity in the sixth chamber,** so that four chambers remain to deal with an increasing make of gas. Owing to insufficient condensers, the gas was in the summer admitted to the Scrubber at a temperature of 70°, but was reduced therein to 61°, or that of the atmosphere. The volutes are driven at the rate of four revolutions per minute, and, working at that speed, there is not the slightest difference between the inlet and the outlet pressure. Clean water supplied at the rate of 10 gallons per ton of coal carbonized is converted into liquor of from 10 oz. to 13 oz. strength **in once traversing the vessel.** The apparatus is extremely simple and compact, occupies but little space, and requires no foundation. I shall be surprised if it does not eventually become extremely popular.

I am, Gentlemen, yours faithfully, (Signed) HENRY WOODALL, Engineer.

Messrs. KIRKHAM, HULETT, and CHANDLER. *The Gaslight and Coke Company, York Road, King's Cross, Jan. 14, 1879.*

Gentlemen,—In reply to your inquiry, I am pleased to say, the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, **it takes out every particle of Ammonia,** while purifying more Gas than it was intended to do. I enclose particulars of a fortnight's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.—I remain, &c. (Signed) JOHN CLARK.

The following Table shows the results of the working of one of these Washers, lately erected to purify 60,000 feet of Gas per Hour, at the St. Pancras Station of The Gaslight and Coke Company:—

1879.	Nos. of the Divisions and Strength of Liquor in each.										Water used per Ton of Coals.	Gas Purified per Hour, Cubic Feet.	Ammonia on Outlet.	Temperature.			Pressures.		Revolutions per Minute.
	1	2	3	4	5	6	7	8	9	10				Inlet.	Outlet.	Atmosphere.	Inlet, Inches.	Outlet, Inches.	
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.									
January 1	8½	6¾	5	3½	2½	1½	¾	¼	0	0	10 Gallons.	52,000	Nil.	77°	73°	48°	24	23	7½
,, 2	8½	7	6	4½	3½	2½	1½	¾	¼	0	10 ,,	57,000	Nil.	73°	66°	32°	21½	20½	4
,, 3	9½	8	6	3½	3	2½	1½	¾	¼	0	10 ,,	60,000	Nil.	75°	68°	40°	23½	22	4
,, 4	9½	7¾	6½	4½	3½	2½	1¾	1	¼	0	10 ,,	63,000	Nil.	74°	68°	33°	24	22½	5
,, 5	9½	7	6	4	3	2½	1¼	¾	¼	0	10 ,,	34,000	Nil.	77°	68°	35°	14½	14	5
,, 6	9½	7½	6½	4½	3	2½	1½	1	¼	0	10 ,,	63,000	Nil.	72°	66°	27°	24	22½	4½
,, 7	11	9	7	5½	3½	3	1¾	1½	¼	0	10 ,,	59,000	Nil.	74°	66°	31°	23	22½	5
,, 8	9½	7½	6	4½	3	2	1	¾	¼	0	10 ,,	78,000	Nil.	73°	61°	31°	28	26½	4½
,, 9	11	9	7	5	3½	2½	1½	1	¼	0	10 ,,	82,000	Nil.	74°	67°	33°	27½	25½	5
,, 10	10¾	8½	6¾	5	3½	2½	1½	1	¼	0	10 ,,	66,000	Nil.	76°	64°	28°	28½	27	5
,, 11	12½	10	7¾	5½	4½	3½	1¾	1¼	¼	0	10 ,,	61,000	Nil.	73°	64°	27°	26½	25½	5
,, 12	11	8¾	6¾	—	—	—	1½	¾	¾	0	10 ,,	39,000	Nil.	74°	64°	27°	26½	25½	5
,, 13	13	10¾	8½	6	4¾	3½	2	1½	¾	0	10 ,,	78,000	Nil.	73°	65°	42°	28	26	5

Messrs. KIRKHAM, HULETT, and CHANDLER. *Corporation of Birmingham, Gas Department, Saltley Works, May 23, 1879.*

Gentlemen,—I beg to enclose you a copy of the results of the tests which, by the kind permission of the Engineer, Mr. Clark, I made the 6th of March last, of the working of one of your "Standard" Washers and Scrubbers at the St. Pancras Station of The Gaslight and Coke Company, and I am of opinion that, for an apparatus occupying so small a space, they are exceedingly satisfactory.—Yours truly, HENRY HACK, Engineer.

Working Results obtained from KIRKHAM, HULETT, *and* CHANDLER'S *Patent "Standard" Washer and Scrubber at the St. Pancras Station of The Gaslight and Coke Company, London, March 6, 1879.*

Gas passing per Hour, Cubic Feet.	—	Impurities in Gas per 100 Cubic Feet.			Temperature.		Pressure in Inches.	Revolution of Apparatus per Minute.	—	No. of Divisions and Strength of Liquor.										Water Used during Experiment. Gallons.
		SH_2	CO_2.	Grains. NH_3.	Washer.	Air.				—	—	—	—	—	—	—	—	—	—	
64,000	Inlet	2·00	2·00	158·8	72	57	21	4½	Twaddel deg. at 60°	5·3	4·9	2·85	2·35	1·7	1·05	0·6	0·3	0·15	0·1	63
	Outlet	1·50	1·50	0·8	68	57	20		Acid, ounces.	11·0	8·4	6·3	4·5	2·7	1·7	1·3	0·7	0·3	—	

WASHER-SCRUBBERS OF THIS PATENT ARE IN COURSE OF CONSTRUCTION FOR BECKTON, BRADFORD, GREENWICH, WOOLWICH, AND SEVERAL OTHER GAS-WORKS.

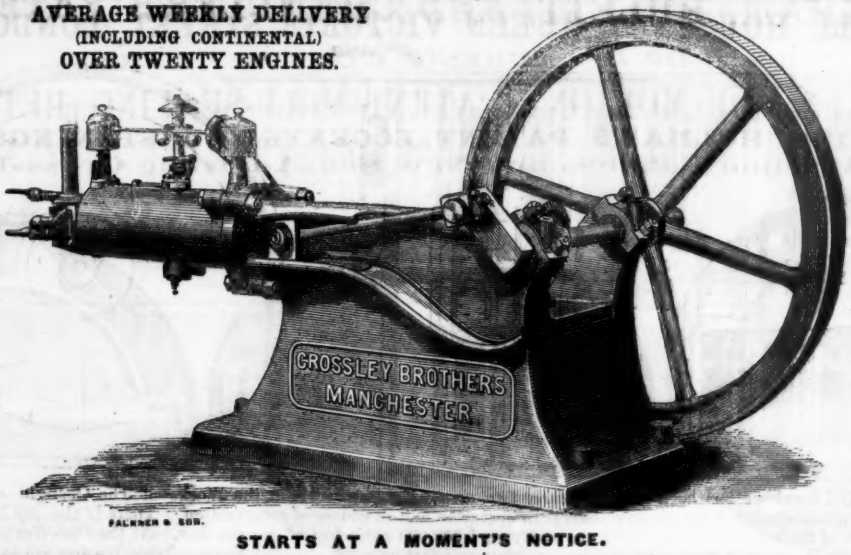
For further particulars and testimonials, address

Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET WESTMINSTER.

AN ENGINE WHICH WORKS WITHOUT A BOILER OR STEAM

AVERAGE WEEKLY DELIVERY
(INCLUDING CONTINENTAL)
OVER TWENTY ENGINES.

The durability of these Engines is now established by experience, one of them having run night and day at the Hinckley Gas-Works for over Twelve months without any expenditure for repair; this being equal to about 2½ years average work.



Over 1900 already delivered.

Very numerous Testimonials from Users, including Engineers, Men of Science, and others, on application to the makers.

No trouble with Coal, Ashes, Smoke, Insurance, Water, or constant attendance.

No Glands to pack, or Water Gauges and Steam Gauges to watch.

STARTS AT A MOMENT'S NOTICE.

THE "OTTO" SILENT GAS-ENGINE.

(Otto and Crossley's Patents, 1876 and 1877,)

THEY ARE USED FOR ALL KINDS OF PURPOSES, CHIEFLY FOR EXHAUSTERS, SCRUBBERS, & PUMPS.

DELIVERED IN MANCHESTER. **SIZES** { NOMINAL HORSE POWER ½ 1 2 3½ 6 8 12 16 / MAXIMUM HORSE POWER ¾ 1½ 2½ 4 9 12 18 24 } **OFFERED.** CASES NOT CHARGED IF RETURNED FREE.

PRICES INCLUDE CAST-IRON STAND, TURNED FLY-WHEEL, AND DRIVING PULLEY; WATER-VESSEL, SEVERAL DUPLICATES, AND GAS-FITTINGS (EXCEPTING METER AND PIPES).

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CROSSLEY BROTHERS, MANCHESTER.

LONDON HOUSE: 116, Queen Victoria St., E.C.

THE NEW GAS COOKER.

40 PER CENT. OF GAS SAVED.

No. A510 same as our **No. A152,**
BUT LINED WITH PATENT NON-CONDUCTOR.
Will Roast, Bake, and Fry, and with Three Burners for Boiling.

SIZE.
Outside—30in. high, 20in. wide, 20in. deep.
Inside—19½in. „ 14in. „ 17in. „

Price . . . . . **£4 14s. 6d.**

No. A500.
LINED WITH PATENT NON-CONDUCTOR.
Is fitted with Roasting and Baking Oven and Four Burners for Boiling.

SIZE.
Outside—34in high, 20in. wide, 19in. deep.
Inside—30in. „ 16in. „ 17in. „
Hot Plate—24in. by 23in.

Price . . . . . **£7 10s. 0d.**

No. A505.
Same as with Roasting and Baking Oven, a Broiler or Toaster, a Chop Griller, a Hot Water Boiler, and Three Burners for Boiling.
Hot Plate—26in. by 24in.

Price . . . . . **£9 15s. 0d.**

These Cookers are jacketed, on the sides, top, and door, with a new and very efficient non-conducting material, by the use of which a **saving** of gas to the extent of **40 per cent.** is effected.

Gas Companies who are selling or hiring stoves should see these stoves. Catalogues and particulars on application to

JOHN WRIGHT & CO., ESSEX WORKS, BROAD STREET, BIRMINGHAM.

London Warehouses: { 155a, Upper Thames Street, / 1, Little Bush Lane.

TANGYE BROTHERS AND HOLMAN,

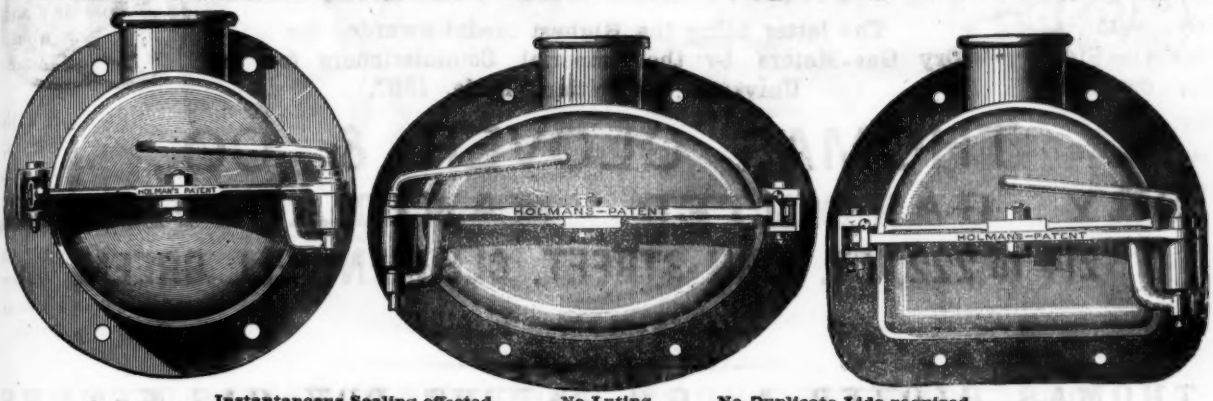
CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,

(LATE OF 10, LAURENCE POUNTNEY LANE.)

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland).

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

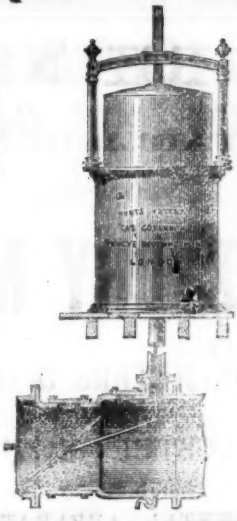
Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.



These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

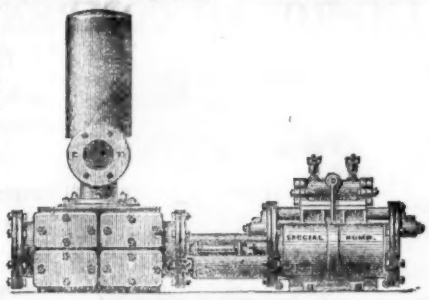
Yours truly,

(Signed) JOHN JOHNSON

PRICES AND FULL PARTICULARS ON APPLICATION.

THE "SPECIAL" STEAM-PUMP.

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4	2	9	815	18
5*	2½	12	1,250*	21
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have over FORTY "Special" Steam-Pumps in use at their several large Tar-Works.

Two Hundred Sizes made. Those in Table opposite are the leading Sizes for use in Gas-Works and Chemical Works.

* These Sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance-piece between steam and pump cylinder, at a small extra cost.

TANGYE'S HIGH-PRESSURE AND CONDENSING STEAM-ENGINES; CORNISH, VERTICAL, & TUBULAR BOILERS; HYDRAULIC AND SCREW LIFTING-JACKS, CRABS, PULLEY-BLOCKS, &c.

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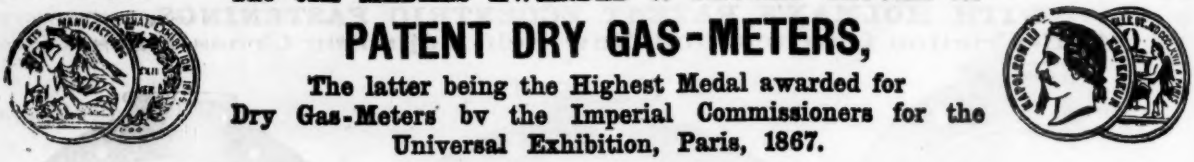

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

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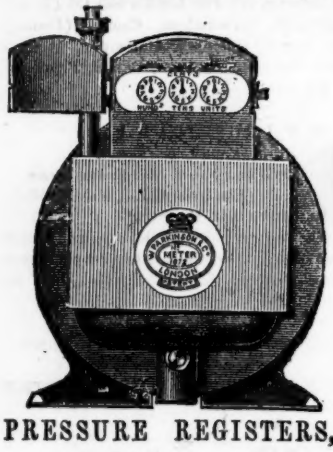
THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.,



(ESTABLISHED 1816,)

MANUFACTURERS OF

WET & DRY METERS,

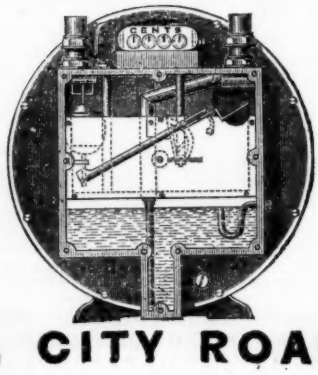
STATION-METERS & GOVERNORS,

EXHAUSTER REGULATORS,

PRESSURE REGISTERS, EXPERIMENTAL APPARATUS, GAUGES, WATER-METERS, &c.

HUNT'S PATENT IMPROVED COMPENSATING METER.

In this Meter, the action of the measuring-drum is reversed. By this arrangement an improvement is effected in the registration at high speeds, which, in many tests, has not varied from the smallest light to three times the capacity of the meter. It works equally well under all pressures. The range of error between the high and low line is much smaller than that allowed by the "Sale of Gas Act."



The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

In consequence of pressure on our space to-day, we are obliged to hold over several articles already in type. Among these are a notice of Liegel's regenerator furnaces; a Communication from Mr. R. H. Patterson, on "The Hydraulic Main;" Mr. W. Foster's third article on "The Corrosion of Iron;" besides the report of a Lecture delivered by Mr. M'Gilchrist at Dumbarton, and the continuation of the report of the American Gaslight Association, &c., &c. These will appear next week, together with the report of yesterday's meeting of the South Metropolitan Gas Company.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, DECEMBER 23, 1879.

Circular to Gas Companies.

An extraordinary general meeting of the Shareholders of the Phœnix Gas Company was held on the 17th inst., to take into consideration, and to approve, if thought advisable, the scheme now before the Board of Trade for the amalgamation of the Company with the South Metropolitan Company. We need hardly say that, in a largely-attended meeting of the Shareholders, there were but few—as a matter of fact they numbered only four—dissentients. The truth must be apparent to all, that these combinations are so advantageous to Gas Companies, that we are surprised that even four objectors could be found to so promising a scheme. The arrangement is, with a very small alteration, that which we have already published, and the changes made comprise simply a re-construction of the capital account. It was originally proposed that the D and E classes, bearing interest respectively at seven and a half and five per cent., should remain as they were until the dividends on the A, B, and C classes of shares were reduced below those rates, and when that catastrophe happened all the classes would share alike. This proposal, which, on the face of it, seems sensible and fair, was objected to by the Board of Trade, on the ground that it practically left the D and E portion of the capital free from the action of the sliding scale, which they consider the Legislature intends to apply to every class of capital. With this alteration, there seems to have been a little difficulty in arranging the capital so as to conform to the wishes of the Board of Trade. It will be done, however, by converting the £360,000 of seven and a half per cent. stock into £270,000 consolidated stock, entitled to ten per cent., and whatever more the sliding scale will allow. The £144,000 in five per cent. stock will be treated in a like manner. If this arrangement should satisfy the Board of Trade, there can be no objection to it; in fact, it may rather turn out to the advantage of the holders of the D and E shares, by allowing them to participate in the benefits likely to result from the operation of the sliding scale. When these benefits accrue, the Shareholders in the Phœnix Company will share with the present South Metropolitan Shareholders equally up to eleven per cent., and then, if a larger dividend is possible, nearly the same division will be made, to the profit of the original South Metropolitan Proprietors, as was settled in the case of the amalgamation with the Surrey Consumers Company; but the Phœnix Company are placed in a little better position. Necessarily, the amalgamation will involve alterations in the price of gas in the Phœnix Company's district. The charge is now 3s. 4d. per thousand feet, and it is proposed to continue at this rate for twelve months after the passing of the scheme, when, if the charge should fall to that now made in the present district of the South Metropolitan Company, the holders of B stock will be entitled to eleven and a quarter per cent. The scheme did not, as we have said, satisfy every Shareholder in the Phœnix Company, a few of whom seem to entertain somewhat high notions as to the importance of the concern in which they have a stake. It is quite true that the expiring Company have a widely extended area of supply, which promises, as time rolls on, to require a very large quantity of gas. There stand at the present time works which are capable of supplying the wants of a considerable portion of the district. They have also raised a large amount of capital, which is fairly well represented, we may take it, by the property owned by the Company. Thus it must be admitted that the Phœnix Company are in an enviable position, and we are not surprised that there are in it some who hold to the opinion that the Company would be better if allowed simply to work its own way. Still, it could not be left alone for very many years. This, however, is a short-sighted view of the case, and those who now most object to the scheme will, we hope, be spared to acknowledge their error in opposing the amalgamation. Perhaps it is unnecessary to carry our arguments farther, for in another column will be found a full report of the meeting of the Company at which the scheme was considered and agreed to. The proceedings of the meeting were of a highly gratifying character, showing as they did the almost entire unanimity of the Shareholders. Nothing now remains to be done by the Directors but to promote, so far as lies in their power, this desirable combination, which will, we hope, soon be officially sanctioned. A special meeting was subsequently held, at which the approval of the Shareholders was given to the promotion of a Bill, which is, in the first place, to empower the Company to amalgamate with any other Company, to acquire additional land, and to raise further capital. This Bill is simply proposed so as to place the Company in a proper position in case the projected amalgamation should fall through.

The strongest opponents to the scheme may be considered to be the Metropolitan Board of Works, whose efforts are directed towards obtaining a lower initial price in the United Company's district. The report of the Works and General Purposes Committee, presented at the last meeting of the Board, sets forth that inasmuch as gas is supplied at 3s. per thousand feet, they regard as too high the Company's initial price of 3s. 6d., and they ask the Board of Trade, before the proposed amalgamation is sanctioned, to bring about a reduction. The unfairness of this proceeding is manifest. The price of 3s. 6d. was fixed after long consideration by a Committee of the House of Commons, altogether in opposition to the wishes of the South Metropolitan Company, who tried to obtain 3s. 9d. We very much doubt whether the Board of Trade will, within so short a time after a standard has been fixed by Parliament as the result of due deliberation, consent to alter the decision of one of their own Committees. It seems to be overlooked by the determined opponents of Gas Companies, that, although the present are good times for the Companies, they may not last for ever. We have before referred to the revival in trade, which it is insinuated by some bodes little good to Gas Companies. Coal and iron, it may be expected, will become dearer, and the maintenance of even a ten per cent. dividend, with the price of gas at 3s. per thousand feet, must be considered problematical. What we may call an upward margin, ought, in all fairness, to be allowed. Let gas be sold at 3s. per thousand feet, if the Companies can make their ten per cent. profit thereby; but it would be a gross injustice to tie them down to a limit which might, under certain circumstances, involve them in a diminished dividend. We feel perfectly satisfied that the Board of Trade will not listen to this contemptible request of the Metropolitan Board,

to place in jeopardy the legitimate dividends of the Gas Companies.

It is an extraordinary thing that so much jealousy should exist between what we may call the two great Local Authorities who manage the municipal affairs of this Metropolis. Our readers have been informed that the Corporation of the City of London have given notice, on their own responsibility, of the promotion of two Bills—one of which is intended, as some would say, to amend the Chartered Company's Act of 1876, which Company only concerns the City of London; and the other was intended to effect a similar alteration in the Acts of the Chartered, Commercial, and South Metropolitan Companies, all of whom concern the Metropolitan Board of Works. We may just mention here that the objects of the two Bills were identical. They were to obtain what we can only call trifling alterations in the mode of testing the illuminating power of the gas supplied, as well as the manner of assessing forfeitures for reputed deficiencies therein, and excesses in impurities. In this proceeding it was quite reasonable that the Common Council should calculate on the co-operation of the Metropolitan Board in obtaining objects which might have been considered common to both. But no; the rivalry between these two Authorities is so great, that no one can settle which is to be predominant in Metropolitan councils. To a simple-minded ratepayer in the Metropolitan district it will seem extraordinary that the Board sitting in Spring Gardens cannot associate themselves with the Corporation of London in obtaining what some people believe to be a great boon; but they will not do it, and, for our part, we do not regret it. Rather a good joke is, that seeing the Metropolitan Board will not agree to join with the Corporation, they propose that the Board of Trade shall appropriate the Corporation's parliamentary notices, and settle the matter.

The Corporation of Dublin will not be at peace with the Gas Company. Now that the existing contract for the supply of the public lights is about to expire, the Corporation renew an oft-repeated demand for a reduction in the charge. At a recent meeting of the Council a most unwarrantable attack was made on the Gas Company. Three years ago, when the present contract was made, the Company were bound down to supply gas for both public and private consumption at 4s. 6d. per thousand feet; but when the Company arrived at prosperity, the Directors voluntarily reduced the charge to 4s. 3d., at which it stands at the present time. This reduction has not satisfied the Corporation, who are seeking to bring down the price still lower. It ought to be mentioned that in Dublin the public lighting plant is lent gratis to the Corporation, and only the small charge of 4s. 6d. per lamp per annum is made for lighting, extinguishing, cleaning, &c. As a fact, each public light costs the Corporation only £3 8s. per annum—a lower charge than is made in most other cities and boroughs in the kingdom. Finding their attack on this point fail, their next object was to attempt to prejudice the Company in the eyes of private consumers. For this purpose they made inquiries all over the country as to the charge for gas, and finding that it is in some places supplied cheaper than in Dublin, they demand, rather than apply for gas to be furnished at a lower rate—3s. 6d., or, if they can get it, at 3s. per thousand feet. The Company, however, find it impossible to accede to these terms, and courteously decline them. The Corporation are not unnaturally anxious to know why gas is dearer in Dublin than in London, and they find one explanation in the alleged excessive amount of capital, which they say has been exaggerated by successive amalgamations effected by the United General Gas Company. Upon this point they are altogether astray, for we believe that this capital was written off in 1866, when the Alliance Company purchased the whole of the plant of the United General Company, on a valuation, for the sum of £240,000. It was alleged that the capital of the United General Company which was chargeable to Dublin was £315,000; but, after a week's contest in the House of Lords, it was reduced to the sum above stated. We mention these facts in order to show what a bad case the Corporation have. With respect to the alleged trifling reduction in price since 1866, the Corporation should bear in mind that a large increase has been made in the illuminating power of the gas. In the year just mentioned twelve-candle gas was supplied; to-day sixteen-candle gas, tested by an ordinary flat-flame burner, is furnished at the reduced price. The Corporation are certain not to gain anything by their present proceedings. They must pay or go to arbitration, from which latter course we rather fancy they will shrink.

A very pleasant gathering took place last Thursday at Tunbridge Wells, on the occasion of what was practically the inauguration of the new gas-works. The really elegant design of these works, excited universal admiration among the visitors. An interesting description of the works will be found in another column, together with a statement of the working details obtained at Maidstone by Mr. West, by the use of his system of drawing and charging retorts, which is also employed in the new works at Tunbridge Wells. It is only fair to say that similar results have been obtained wherever the system has been adopted.

Every day brings more and more evidences of a striking revival in the coal and iron and the fire-clay goods trades. We hope that before any great rise takes place in prices, Gas Companies who have large works in progress will push them on with all the energy possible consistent with safety. Contractors may be safely trusted to take care of their own interests. It may be that the prices of English coal will rule low for a longer period than was anticipated. We have sent a considerable quantity of coal to Germany; but in consequence of an alteration in the railway freights for coals from Upper Silesia to Western Prussia, which latter province has taken a good deal of our coals, and hitherto found them come cheaper than German, it is reported that we are likely to be shut out from that market shortly, which will leave a large amount of gas coal for home consumption, and, of course, with some resulting advantages to gas-makers in this country. We hope so, at all events. Spring contracts will, no doubt, be obtained at cheap rates, and probably long terms will be secured. The steel manufacture is also rapidly reviving. Works at Bishop Auckland, Durham, which have been closed for some four years, have just been re-opened, and will presently, it is expected, furnish employment for five hundred men. Large contracts for steel, it is said, have been secured by the new firm of proprietors, and these are expected to afford continuous employment for a considerable time to come.

Water and Sanitary Notes.

The Metropolitan Water Companies are in a highly prosperous state. The causes of this are partly disclosed in the interesting report presented by the Directors of the Chelsea Water-Works Company at the half-yearly general meeting held on the 18th inst. The primary reason is that London grows so rapidly that even the enterprise of the Companies can hardly keep pace with the ever-increasing wants. We read that in the Fulham district of this Company alone 273 new houses have been built during the past year, and that during the past half year 245 new supplies have been connected with the works. The increase in the rental is, however, not so large as might have been expected. The explanation of this, we presume is, that new services have been laid to low-rated property. The increase of the water-rental for the half year has amounted to £714, and we are glad to notice the considerable decrease of £1023 in the cost of maintenance, &c. The balance of revenue account applicable to dividend is £50,384, out of which the Directors propose to pay a dividend of six and a half per cent. per annum—one-half per cent. more than the Shareholders have previously received. It is highly gratifying to see the Water Companies thus gradually rising in value. Their future is uncertain. Mr. Cross will be upon them early in the session, with, it is supposed, the intention of wrenching away their property. It was, of course, impossible for the Chairman of the Chelsea Company to pass over this matter without special reference. He promised the Proprietors in any negotiations that took place with the Government their interests would be protected as far as possible. This, of course, means that Mr. Cross's idea of buying up the Companies at what they were worth last June will be sternly protested against. As we said, when noticing the Southwark and Vauxhall Company's meeting, the value of the London water undertakings increases day by day, and whenever they are taken over, and by whatever authority, they must be taken at their worth at the time of transfer. Some months ago we expressed an opinion that Mr. Cross would put himself in communication with the Companies in order to ascertain their views, and it would appear that some correspondence or negotiations have taken place, the result of which, up to the present time, has not been made public. They will necessarily partake of a somewhat delicate character; but if any agreement be come to, special meetings of all the Companies are sure to be called, at which everything will be revealed.

The meanness of local bodies in general is remarkable; but we have seldom found a more glaring instance than is shown in some recent dealings of the Islington Guardians with the

New River Water Company. The Guardians take water by meter for the parish schools, and finding their last account rather heavy, they sought for the cause, and found it in a leak occasioned by some negligent work of a contractor. Thereupon, when pressed by the Company for the payment of the account, the Guardians make a piteous request to the Company to take off £50 from the account, because the leak was not occasioned by any fault of their own. This is perhaps the most curious appeal *ad misericordiam* we have ever met with. It would be a precisely similar case if a customer, having made a purchase of a tradesman and lost his parcel, went back and requested to be supplied with other goods without payment; and it is not likely that the Company will listen to so monstrous an application.

The Exeter Corporation seem to be highly pleased with their new toy, the water-works, which perhaps it is only right to say appear to be, in their hands, a fair success. How far the water consumers have been advantaged by the change of proprietorship is not very obvious. In many cases, however, the rates have been reduced, but in others greatly advanced. On the whole, the small consumers appear to have been benefited by the change; but how about the quantity of water they receive? Waste-meters have been distributed about the town, and an enormous leakage has been detected and promptly checked. This may not affect the comfort of the consumers, but it sufficiently denotes that the Corporation are not so liberal in their dealings as the old Company were. The next thing that may give offence to the inhabitants of the city is the intended constant supply; as, before this can be given, stringent regulations as to the strength of fittings and internal arrangements will have to be complied with. Wherever such regulations have been strictly enforced, they have invariably given offence, although, in our opinion, they are absolutely necessary for the protection of the consumer on the one hand, and the purveyor on the other, especially when the water is supplied at high pressure. It may be remembered that the objections to such regulations stopped the general introduction of the constant system into London and Liverpool. We read nothing in the report of the Water Committee and the Borough Surveyor of Exeter, presented at the meeting of the Town Council last week, of the introduction from Dartmoor of a purer supply of water than that from the River Exe. Although so much was made of this by the Corporation when the transfer was under consideration, it has turned out, as we surmised it would, that the idea of adopting any other source than that of the Exe has been dropped.

Mr. E. J. Lloyd, late assistant to Mr. V. Wyatt, at the Beckton works of the Chartered Gas Company, and assistant to Mr. John Storer, Manager of the Stafford Corporation Gas-Works, has been appointed Resident Engineer at the Dudley Gas-Works.

Mr. Robert Fish, who was formerly connected with the Hornsey Gas-Works, and is now at Bucharest, was, on the 11th inst., decorated by His Royal Highness Prince Charles I. of Roumania with the Order of Chevalier (Star of Roumania), for conspicuous services in maintaining the general lighting of the city during the late war, and the complete renovation of the gas-works.

Sale of Stock in the Bristol United Gaslight Company.—Last Friday, Messrs. H. R. Fargus and Co. sold by auction £15,000 of stock in the Bristol United Gaslight Company, and issued by them under the authority of their Act of 1873. The property, which was sold in lots of £100 each, realized from £173 to £175 10s. per £100. All was disposed of.

Annual Dinner of the Society of Engineers.—Over a hundred of the members of this Society assembled last Wednesday at the Guildhall Tavern, Gresham Street, on the occasion of their 25th annual dinner—Mr. R. P. Spice presided. Mr. J. Bernays (President Elect for 1880), Mr. C. Horsley, Mr. Alfred Williams, Mr. Jabez Church, Mr. T. Porter, Mr. Baldwin Latham, Colonel Cowen, Professor Glaisher, F.R.S., Mr. Littler, Q.C., Mr. Perry F. Nursey, and Mr. A. Elgan (Secretary), being among those present. The Society was established in 1854, for the advancement of engineering science, and now numbers 400 members and associates. Among its noticeable features are the facilities which are afforded to its members for visiting works of professional interest. In proposing the toast of "The Army, Navy, and Reserve Forces," the Chairman reminded his hearers that at the present moment an important section of our army was engaged in very serious work, striving to maintain the honour of our country amid barbarian hordes celebrated for their treachery and want of good faith. The moment was one in which all should rise superior to the ties of party, trusting that in the end the achievements of the army would give just cause for pride. The next toast was that of "Success to the Society." The Chairman, who proposed it, remarked that, like other societies, theirs had lately gone through a time of trouble, in consequence of the depression of trade and industry; but now he was glad to see a clearer atmosphere before it. Mr. Alfred Williams also made some observations in reference to the toast, dwelling especially on the advantages which young men could derive from a connection with the Society; and Mr. Horsley then proposed the "Health of the President" (Mr. Spice). Before the company separated, a testimonial, consisting of an illuminated address, a piece of plate, and a purse of £150, was presented to Mr. P. F. Nursey, who has recently resigned the post of Secretary to the Society. Having acknowledged the compliments of the Chairman, who described the presentation of the testimonial as one of the most pleasing duties which he had ever had to perform in connection with his office of President, Mr. Nursey congratulated the Society on the increase in the number of members during the past year, and on its satisfactory financial position.

THE METROPOLITAN BOARD OF WORKS AND THE AMALGAMATION OF GAS COMPANIES.

The best friends of the Metropolitan Board must regret the course which that body is now pursuing in reference to the London Gas Supply. At their meeting last Friday, it was resolved to send to the Board of Trade a communication objecting to the scheme for the amalgamation of the South Metropolitan and Phœnix Gas Companies, the ground of objection being that the initial price of 3s. 6d. per thousand feet was too high. The demand for a lower initial price was founded on the circumstance that the South Metropolitan Company are paying a dividend of eleven and a half per cent., while charging 3s. per thousand feet for their gas. Such being the case, it is argued that 3s. would be sufficiently high for the initial price. Mr. Richardson, who was one of the speakers supporting the objection to the amalgamation scheme, candidly stated that when, a few years ago, the Board agreed to the principle of amalgamation, "it was not "contemplated that the Companies could sell gas at less "than 3s. 9d. per thousand feet, and pay ten per cent. "dividend." "Therefore," says Mr. Richardson, "the Board "agreed to 3s. 9d. per thousand feet with The Gaslight and "Coke Company." "Therefore," also, we presume, the Board agreed to 3s. 6d. as the initial price for the South Metropolitan. The Metropolitan Board contended at that time that 3s. 9d. and 3s. 6d. respectively was an adequate price, and consented that if the Companies charged less, they should be entitled to an extra dividend. But now we are told that it was never thought the Companies would gain anything by the seeming privilege, though it was evident that the scale might turn against them, so that they might be all the worse for the new terms under which they were henceforth to conduct their industry.

Thus we appear to learn, if Mr. Richardson is an exponent of the policy of the Metropolitan Board, that the real intention of the authorities at Spring Gardens is, if they possibly can, to keep the Gas Companies from gaining any more than ten per cent. dividend, at the same time exposing them to the risk of getting less. So, in the case of the South Metropolitan Company, it is considered that the Shareholders ought not to have more than ten per cent., and the initial price ought so to be fixed as to render anything higher impossible. Of course, the Board has a right to its own opinions; but a public body has a reputation either to gain or to preserve, the same as an individual, and it is not well that the Metropolitan Board should entertain ideas which are superficial and absurd. Its idea of a sliding scale of price and dividend is that it shall always slide one way. If the system operates in such a manner as to bring down the dividend below the old statutory limit, so that the Shareholders are all the worse for the bargain, this is considered perfectly legitimate. Such a result has not accrued, but it is perfectly certain that if it did the Companies would receive no mercy. But inasmuch as the scale has thus far operated to give the Companies the benefit of their skill and economy, the Board wishes to see the terms altered, so that the extra dividend shall be removed altogether out of reach. In fact, the policy of the Board towards the Gas Companies is after the fashion expressed in the homely phrase—"Heads I win, tails you lose." The Companies may lose, but they shall not gain.

The case of the Gas Companies in reference to this question can very well be fought on its merits. But, apart from the real merits of the case, it will be seen that the present is not an occasion on which the Board can raise the question of the initial price. The law has laid down the lines within which an amalgamation scheme can be framed, and the Board now comes forward to quarrel with the law. If this be the sort of enterprise on which the Board is intent, it must go for redress to those who make the law, and not to those who administer it. Mr. Runtz appealed to the Board not to make itself ridiculous by urging an objection which the Board of Trade could not entertain. Mr. Selway, in like manner, declared that the resolution would "stultify the Board." Despite these appeals to its better judgment, the Board adopted the report of the Works Committee, which embodied this unfortunate policy, and we are sorry to say that the majority was a large one, if we may judge by the votes which decided the fate of Mr. Runtz's amendment.

When the Board stands up as the champion of the consumer, to get the greatest possible advantage out of the Gas Companies, there is a fair reason for the fight. So far the Board is doing its duty, and the Companies have simply to defend themselves as they best can. But when the fight is over there should be a fair and reasonable submission to the issue of the conflict. As the case now stands, the battle was fought some three years ago, and the Board now comes for-

ward to fire off its guns in the air, declaring itself extremely dissatisfied with the last treaty. If the Board really means fighting, it must come within range—that is to say, it must go before Parliament. If we are told, in reply, that the Board at present has no chance of going thither, we can only say that the Board ought to accept the situation, and keep good faith with the Companies. When the Companies appear in Parliament and ask for fresh powers, the Board will have an opportunity of renewing the conflict before a Select Committee. If it feels impatient of delay, it must yet learn to control itself and abide by the law, the same as other people.

Cui bono? Can any member of the Board show any good that is likely to result from the opposition thus offered? Let us suppose, for argument's sake, that the Board of Trade is possessed with the same idea of its supreme power which seems to be entertained by the Metropolitan Board, and proceeds accordingly to enforce on the South Metropolitan Gas Company a reduction in its initial price as a condition of the amalgamation. The result will simply be that the South Metropolitan Company will decline the amalgamation, and the Phœnix Company will be at liberty to continue its present price of 3s. 4d., with power to charge as much as 4s. 6d. without any interference or compulsory reduction of dividend, and without those obligations as to lighting power and purity of gas which are enforced on the Companies who are subject to the sliding scale. If, on the other hand, the Board of Trade treat the communication from the Metropolitan Board as something altogether beside the mark and *ultra vires*, the price of gas throughout the Phœnix district will come down to 3s., and the parliamentary standard will go up to sixteen candles. Mr. Rogers, in the warmth of his attachment to Camberwell, is afraid that the consumers of the Phœnix district will be benefited at the expense of the South Metropolitan consumers. We suppose it is very difficult to devise any amalgamation in which some drawback of this kind might not be suggested. "The greatest "good to the greatest number" must often be the rule in dealing with public questions. The members of the Metropolitan Board should be careful to free themselves from the suspicion of being simply so many Vestry delegates watching over their respective parishes. A Vestry has its own local duties, which it is bound to perform; but the Board at Spring Gardens is Metropolitan, and should care for London as a city. In the end, such a policy is best for all. The proposed amalgamation between the South Metropolitan and Phœnix Companies would extend to a wide district of South London the benefits of a system which is deemed advantageous to the public where it already exists. If there is to be this precise balancing of parish against parish, how could the Metropolitan Board ever propose taking the whole gas supply into its own hands? What would become of Camberwell parish in that case? Mr. Rogers on Friday last professed himself "at a loss to understand why the consumers in the South "Metropolitan district should, by amalgamation, be robbed of "the advantages which they now possessed." This was the voice of a Vestryman. Then followed an utterance which was intended to suit the more bracing atmosphere of Spring Gardens, Mr. Rogers stating that "he was not one of those "selfish men who would say that other districts should not "be benefited, so long as the interests of the consumer were "properly protected." If this sentiment were really carried out, we should expect to see the resolution of last Friday rescinded. But, though the conclusion of Mr. Rogers's speech thus contained a kind of repentant concession to a liberal and comprehensive policy, the speech itself was altogether what we should term reactionary.

Nothing is right when a Gas Company prospers. This appears to be an axiom with a majority of the members at Spring Gardens. It may be that they are either in fear of the Vestries, or find themselves unable to shake off their local prepossessions and prejudices when professedly endeavouring to promote Metropolitan interests. At the same time, we must confess that the kind of talk in which the Metropolitan Board indulged for one whole hour last Friday is very popular out of doors. The consumer has been told over and over again that he is oppressed and victimized by the Gas Companies, and he has heard this story so long that now he will scarcely consent to hear anything else. The organs of public opinion, with few exceptions, do their best to bring odium on the Gas Companies. Any one who makes a calm appeal to the real facts of the case, like Mr. Runtz, is pretty sure to be told that he is arguing in the interests of the Companies rather than of the consumers. We submit that the consumer is none the better for being misled on this question. If the Board had possession of the gas supply, its members would feel aggrieved if they were attacked after the fashion which the Gas Companies now have to endure, the accusers being either ignorant of the real facts, or fixedly prejudiced on the subject. For its own sake, the Board had better deal fairly with the Gas Companies, and at least, when a bargain is made, adhere honourably to it.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

THE PORTER-CLARK PROCESS FOR SOFTENING AND PURIFYING WATER.

SIR,—Your issue of the 16th inst. contains an article upon "Softening Processes for Hard Water," in which reference is made to the Porter-Clark process in a manner calculated to give an erroneous impression that is detrimental to my interests; and I trust to the impartiality that distinguishes your profession to give me space to correct it.

You say my modification of Dr. Clark's process "was adopted at the New Middlesex Asylum on Banstead Downs," and that "there, in the early part of 1878, about 6000 gallons of water per hour were purified, throwing down and separating the impalpable powder as mud, with increased rapidity and efficacy, by forcing the water to pass through discs of cloth after being treated with the lime. The operation was, however, both slow and costly." Now, I think your readers would infer that, being "both slow and costly," the process was discontinued after the early part of 1878. Professor Ansted, to whom I had the pleasure of showing it in operation there, speaks of it, I see, as "both slow and costly," but he says nothing of 1878; but says, "about 6000 *gallons per hour are purified*." As to its "slowness," 6000 gallons per hour was the quantity the Visiting Magistrates contracted for; and this is what, under date of Sept. 12, 1879, they say of the process: "Up to the present time the Porter-Clark water-softening process, which has been in operation at this Asylum for about two years, has satisfactorily answered the purpose for which it is intended."

I enclose you copies of other testimonials to the like effect from the Kent Magistrates, in relation to their County Asylum at Chartham; from Mr. Lloyd, of Salisbury Square, as to its application at his paper mills at Sittingbourne; and from Mr. Duncan, in relation to his sugar refinery in London; and I beg to call your attention to certain other remarks by Professor Ansted, in his work to which you refer: "To the engineer and manufacturer it is convenient to bear in mind that the loss or destruction of soap by hard waters is at the rate of about 2 ounces per 100 gallons for each degree of hardness for each grain of chalk per gallon. Thus a water of 16° of hardness (Clark's soap test) contains 16 grains of chalk (or its equivalent) per gallon, and 100 gallons of such water would take 32 ounces of soap to reduce it to the condition of distilled water. Two pounds of soap, therefore (costing something less than 8d.), represents the total loss sustained by using each 100 gallons of such water for ordinary domestic purposes and manufacturing uses requiring soft water without boiling." Professor Ansted would have added to the interest of the subject if he had calculated what is the loss of fuel in the manufactories and in private households (to say nothing of the cost of repairs to boilers and pipes) by the use of water of that degree of hardness, or of water of the degree of hardness of the Thames water supplied to London, which at page 184 he shows to contain 11·91 grains of carbonate of lime per gallon—only 4° less than the deep well waters from the chalk.

I have also to remark, with your permission, that when you say Dr. Clark's process has been adopted at Caterham, Canterbury, Tring, Aylesbury, Red Hill, Colne Valley, Swindon, and by the Kent Water Company, and that "in some cases it has been retained," I believe that it is retained at all those places, with the exception of the Plumstead works of the Kent Water Company. Certainly, the Colne Valley works, by the President of the Institution of Civil Engineers, were carried out after long experience of the working of the others you cite—save the Swindon example, which has yet more recently been carried out, allow me to say, upon the Porter-Clark system, and with perfectly satisfactory results in purifying water, not only from mineral in solution, but from vegetable matter in suspension. As I have said elsewhere, the filtration is exquisite, and everything arrested is removed daily, together with *the filtering medium of pure carbonate of lime* produced continuously in the process of softening.

JOHN H. PORTER.

[We have much pleasure in giving Mr. Porter this opportunity of referring to his modification of Dr. Clark's process, and only desire that the facts should be ascertained and recorded. It is evident that the question of slowness is connected with that of cost, which is not alluded to by Mr. Porter, either in his letter, or in the testimonials accompanying it.—ED. J. G. L.]

TESTING GAS-MAINS.

SIR,—Noting your report of Mr. F. W. Brothers's paper on the above question, read before the Manchester District Institution of Gas Engineers, I beg to say that I have for many years past tested for escapes as suggested by him, but in a much more expeditious and less expensive, though quite as effective manner; and I have not had any difficulty in localizing the escape in a short time.

My plan is to drill two holes in the main, at a distance of, say, 50 or 100 yards, or to disconnect two services and insert two bladders; then I shut off the supply to each house within the distance, by closing the cocks, and blow in the main through one of the services, by which means I can detect even the smallest escape. If I find the first portion to be sound, I remove the first bladder to a third opening, leaving the second bladder in, till the second section is tested—and so on.

If I failed to detect the escape by this plan (which I never have), I should pass gas into the main between the bladders through a meter under ordinary pressure; which would at once show the actual loss, and if any consumer were using gas, and were unwilling to have his supply stopped for so short a time (say ten minutes), then his consumption could be ascertained by his meter, and the difference would show the loss, if any.

I may say that last winter I detected and localized three broken mains, the escape from one being only about 5 feet per hour.

I would suggest as a further means of preventing escapes from wrought-iron service-pipes—the great source of evil—that they should not be too large for the work they have to do, and should be of such strength that the corrosion should stop the supply before they were sufficiently decayed to allow gas to escape. I have seen ¾-inch iron service-pipes taken up, after 14 or 20 years service, nearly stopped by corrosion, but still quite sound on the outside—a proof, I think, that size and substance are the two most important considerations with regard to wrought-iron services.

Mr. Brothers asks, "Why should not an iron plate be placed over the short service-pipe passing from the supplementary main to the consumer, so that each year it could be removed, inspected, and painted?" In reply, I would say, "Because if the main broke anywhere near, the gas would find its way through the channel into the house, and be a source of great danger. Besides, this precaution would be a very expensive one."

G. GOLDSMITH.

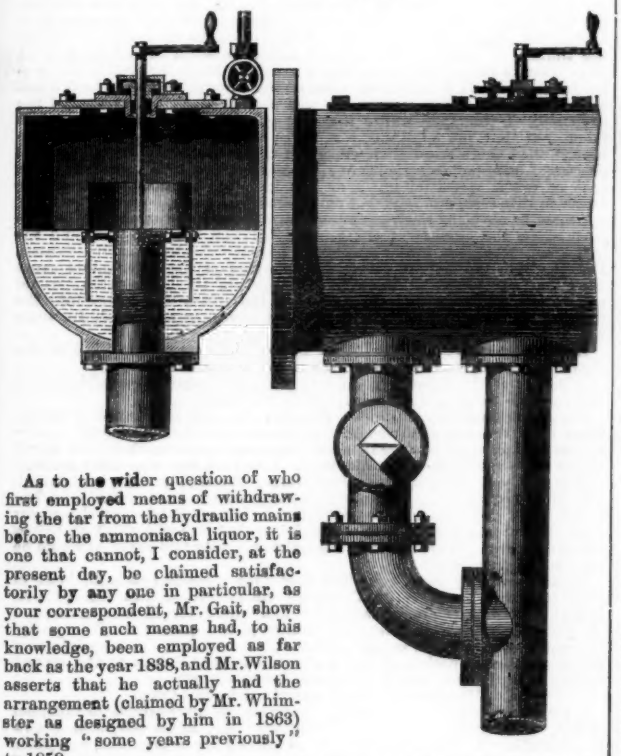
Gas-Works, Leicester, Dec. 19, 1879.

THE REMOVAL OF TAR FROM, AND THE REGULATING OF THE WATER-LEVEL IN HYDRAULIC MAINS.

SIR,—When I replied, in your issue of the 2nd inst., to Mr. Whimster's letter, I confined myself to denying that he had anything to do with my design for effecting the above-named purpose; and how he supposes that I have "tacitly allowed" his claim is more than I can understand. By the wording of his letter in your issue of the 25th ult., it never for one moment occurred to me that there was any inference in it that he actually meant to claim that he was the inventor of the idea for removing the tar before the liquor from hydraulic mains; or else I would have replied otherwise.

It now appears that he does not claim anything to do with the design of my apparatus, but that he claims the credit of designing *the apparatus*, which must be the apparatus described by him in your issue of the 25th ult. This being the case, and the apparatus described by him having no reference whatever to my arrangement—which is certainly a far better one—how Mr. Whimster comes to connect my name with his description of an overflow used by him, and which I do not claim to have designed, I have some difficulty in comprehending.

To make my letter better understood, I here emphatically deny that he designed my apparatus, and further state that the hydraulic main overflow, regulator, and indicator combined, lately spoken of as "second to none," is my own design. I accompany this letter with a sketch of my apparatus as used by me prior to my reading a paper on the subject, and as reported in your JOURNAL for April 15, 1873.



As to the wider question of who first employed means of withdrawing the tar from the hydraulic mains before the ammoniacal liquor, it is one that cannot, I consider, at the present day, be claimed satisfactorily by any one in particular, as your correspondent, Mr. Gait, shows that some such means had, to his knowledge, been employed as far back as the year 1838, and Mr. Wilson asserts that he actually had the arrangement (claimed by Mr. Whimster as designed by him in 1863) working "some years previously" to 1858.

Mr. Hall, by his letter in your last issue, has added some interesting information. The plan he gives as No. 2, I saw in use at his works in the year 1864, and it had been in operation for some time previous to that date. This fact only shows how managers may adopt means to overcome difficulties, and that without acquainting their fellow-managers; so that, at the present time, it would be quite useless to take or give any credit in regard to being the first inventor of the idea, as it is already shown to have been in operation in 1838, which is sufficient of itself as a ground for believing it may have been in operation earlier.

Mr. Hall, in his further remarks on plan No. 3, gives the credit of designs Nos. 1, 2, and 3, to the late Mr. John Z. Kay; but, as I must, from the correspondence that has passed, protect my own design, I have to separate in his letter the "facts" from the "fanciful."

It is important that facts only be inserted; and his exclamation, "How easy!" in the following quotation from his letter, reminds me of the story of Columbus and the egg:—

"In these three plans there are the adaptations for removing the tar from the hydraulic main; but, as yet, regulating the water-level is not attempted. It will, however, be at once seen, from plan No. 3, how easy and natural that step was. Fancy 3 or 4 inches cut off the top of the overflow-pipe, and on this pipe a moveable piece placed, with a rod through a stuffing-box on the cover, so that the piece could be raised and lowered, and you have, I guess, an efficient water-level regulator, as well as a plan for the removal of tar."

Yes, "How easy!" But what about the "egg"? Why was it not dumped on the end till the Grand Cardinal of Spain was shown the way?

These quotations being fanciful, Mr. Hall cannot give to the late Mr. John Z. Kay the credit of the design they describe, for it is a very good description of my own arrangement; not, however, placed in a box outside, but fixed inside the hydraulic main, as shown in the sketch, and which, I think, must compare favourably alongside any of the designs described by your correspondents. It has no expensive and troublesome bend-pipes, heavy castings and valves, cisterns, &c.

Regarding Mr. Hall's plan No. 5, this arrangement I knew to be getting put into shape in May, 1873, three months after I read the paper on my arrangement, and three years after I designed and used my apparatus; and while Mr. Hall thinks this plan requires no explanation, I must say that it is an application to an overflow purpose of Chandler's patent dip-pipe, as shown at page 292 of the same JOURNAL (for April 15, 1873) in which my design appeared, being somewhat like mine in the use of a spindle and a screwing-tube, and without having the same advantage as to the removal of tar.

I trust these remarks may be sufficient to maintain the individuality of the design disputed, as I do not wish to further add to this correspondence.

Gas-Works, Tradeston, Glasgow, Dec. 17, 1879. WILLIAM KEY.

SIR,—I see by Mr. Whimster's letter, in your JOURNAL of Dec. 16, that he does not agree with the statement made by Mr. A. F. Wilson, on behalf of the late Mr. Robert Ford, as to priority of knowledge (if not invention) of an apparatus for taking the tar from the bottom of the hydraulic main, and regulating the water-level, and which Mr. Wilson says he found at work in 1858. It may, therefore, not be very much out of place for me, if I may be permitted to do so through your columns, and while the subject is being ventilated, to make as brief and as clear a statement as it is in my power to do in reference to the late Mr. Robert Ford—who, I may as well state, was my father—and his connection with the matter now under review.

Mr. Whimster says in his letter to you: "Mr. Ford, for whom the claim is now made, was alive and active many years after that, yet he made no sign." It is true Mr. Ford was alive, and probably true also that he made no sign; and I may account in some little way for his not doing so by stating that in the year 1859 my father left Perth, and went to Ireland, and lived there for about sixteen years. In 1860 his health became impaired; in 1861 he became very much worse, and had, in consequence, to resign the position he held. During 1862 and 1863 there was very little, if any, improvement, though subsequently he did recover a little, and was able to undertake certain duties, but was never again restored to sound health, and I do not believe he ever even heard that Mr. Whimster had made any such claim for the invention, which now, "as then," he believes he has or had invented.

Speaking for myself, I did not know, until I read his letter of the 22nd of November last; and I may state, in confirmation of what has already been done, that among a number of methods or inventions my father tried, in order to reduce the pressure on the retorts and economize lime in the purification of gas in those days, by turning the hydraulic main into a washer, there was one very much akin to that described by Mr. Whimster; and another, if not a *fac simile* of the simple contrivance adopted by Mr. Gait in the year 1852, nevertheless a partition inside the hydraulic main. I will not attempt to state at what dates the ideas were conceived or adopted by my father, as I do not know. Being away from home at an early period of my life, I had not the opportunities of making myself acquainted with the facts until some years after they had been accomplished. Neither do I know at what time, nor by whose hands, they were removed; but I have very little doubt these things could easily enough be traced by any one at all anxious to do so.

Dec. 20, 1879. A. FORD.

DR. WALLACE, of Glasgow, has asked us to state that he is not a Fellow of the Royal Society, and, therefore, the letters "F.R.S." should not have been placed after his name when printing, in the JOURNAL of the 9th inst., the paper he read before the Philosophical Society of Glasgow, "On the Heating Power of Coal Gas of Different Qualities."

THE WATER SUPPLY OF MARSEILLES.—Mr. R. P. Spice, in the little pamphlet noticed last week, under the title of "The Hermit of Westminster," when referring to Marseilles, says: "Too much praise cannot be given to the great work achieved and exhibited in the water supply of this city, which is exceptionally good. The water is obtained from the River Durance by means of an aqueduct unsurpassed by any work of the kind, ancient or modern. It pierces three mountain ranges, has 78 tunnels of a united length of 15 miles, and about 500 artificial constructions, many of which are marvels of engineering skill. Its total length is 51 miles, and its dimensions 30 feet wide at the top, 10 feet at the bottom, and 7 feet in depth. The fall in its course is 125 feet, and the delivery into a grand cascade, at the entrance to the Zoological Gardens, is a masterpiece of hydraulic work, and the finest example of an artificial waterfall in Europe, for trade purposes. Eleven tons of water per second are supplied in a constant, perennial stream, falling 20 feet into a basin below, from which it is taken in pipes and distributed throughout the city. The way in which the water is conveyed to, and received at the point where it enters the distributory mains, is such as to ensure its being aërated or oxygenated, and so being in the best possible condition for use. The benefit which this magnificent work has conferred upon and secured to the city is beyond calculation or conception. By means of the great abundance of the supply, arid places of enormous extent have been converted into fertile pasture land; and the beneficial influence exerted upon the health and comfort of the citizens is probably the greatest good of all; and, as a whole, the work is entitled to be considered as being second to nothing of the kind on the Continent."

Legal Intelligence.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

MONDAY, DEC. 15.

(*Sittings in Banco, before Justices* LUSH *and* MANISTY.)

REGINA *v.* THE CORPORATION OF LEAMINGTON.

This case raised the question as to whether, when a corporation is also an urban sanitary authority, and, as such, receives funds, those funds ought to go to the borough fund or in aid of the district rates. The question had arisen thus: The Corporation of Leamington are the Urban Sanitary Authority for a district comprising some outlying parishes, and in that capacity they dispose of the sewage of the district, receiving from Lord Warwick and others as much as £3000 a year, which they had carried to the borough fund, whereas it was contended that it ought to be carried to the account of the district rate, so as to reduce the rates for the district. The question was raised by an application, the object of which was to compel the Corporation so to apply these funds.

Mr. CAVE, Q.C., and Mr. DUGDALE were for the applicants; Mr. MELLOR, Q.C., and Mr. GLEN for the Corporation.

After hearing at some length the Counsel for the Corporation,

The COURT said they had no doubt the Corporation were bound to carry the fund in question to the account of the district rate of the sanitary district of which they were the head, so as thus to reduce the district rates, and that they were wrong in carrying it to the borough fund.

Mr. MELLOR, on hearing this expression of opinion, intimated that he had no doubt the Corporation would bow to it; whereupon,

Justice LUSH said they had taken the proper course, and therefore the order made would be without costs.

COMMON PLEAS DIVISION.—TUESDAY, DEC. 16.

(*Before Lord Chief Justice* COLERIDGE *and a Special Jury.*)

PHILLIPS *v.* PHŒNIX GASLIGHT AND COKE COMPANY.

In this action the plaintiff sought to recover compensation for the destruction of four cottages, which he alleged was caused by excavations carried on by defendants for the purpose of erecting a new gasholder.

Mr. GRANTHAM, Q.C., and Mr. COCK appeared for the plaintiff; Mr. MATTHEWS, Q.C., and Mr. PITT LEWIS for the defendants.

Mr. GRANTHAM, in opening the case, said it was one of considerable importance, not only to the present plaintiff, but to owners of property generally, because it raised the question of the right of persons in the possession of land to deal with it in a manner which would injure other property. The plaintiff some few years ago purchased a number of cottages, called Blucher's Buildings, at Greenwich. The houses were about 60 years old. The defendants were the owners of adjoining land, on which they had placed their gasholders. In consequence, no doubt, of increasing trade, they found it necessary to erect an additional large holder, and it was in the doing this that the injury was caused which resulted in the destruction of the plaintiff's houses. In order to carry out their works, the defendants had to excavate to a considerable depth; but it could not have been necessary for them to go down to such a depth as they had in the present case—namely, 70 feet. In doing so they found that water kept flowing in, and they had to put up pumps which were constantly going for over twelve months. The soil was of various kinds—alluvial deposit at the top, next peat, then clay, &c. The plaintiff's houses being near the excavation, the support which they received from the adjacent soil was taken away, and even the new wall which the Company erected had more than once fallen down. The work was commenced in the early part of 1878, and about two months afterwards settlements were noticed in the cottages, and these gradually got worse. No doubt the houses were old, but they had stood very well before, and were in very fair condition for buildings of that character. The witnesses on behalf of the plaintiff would state that as the work of excavation went on, the houses showed indications of settlement, and iron stays had first to be put up, then shores, and ultimately the District Surveyor condemned them, and they had to be pulled down and rebuilt. Since the pumping operations had been going on, the opposite difficulty had arisen, and now the water which was put in the gasholder tank escaped. To remedy this, horse dung was thrown in, in the hope that it would gradually work down and fill up the crevices through which the water flowed. There could not be any doubt that the houses began to subside in consequence of the works carried on by the Company, and after the jury had found, as he trusted they would, a verdict in favour of the plaintiff, the question would arise as to the respective rights of the plaintiff and defendants under the particular circumstances of the case.

Lord COLERIDGE: Is there much controversy as to facts?

Mr. MATTHEWS: Oh, yes, my lord. I shall show that the houses had been tumbling down for years.

Mr. *Benjamin George Phillips*, examined by Mr. COCK.

I am a licensed victualler, and owner of Nos. 1, 2, 19, and 20, Blucher's Buildings, Roan Street, Greenwich. I bought the property in 1875. In October, 1877, I noticed that they were cracking, my attention having been called to the matter by one of my tenants, named Cronk. The Company's works had been going on for some few months previously. The cracks gradually spread, and about October, 1878, I caused struts to be put up. On Sept. 19, 1878, I wrote to the Company about it, and afterwards saw Mr. Crookenden and Mr. Wates. Mr. Wates said it was not their fault; but Mr. Crookenden turned round and said, "What will the damage be, about?" I replied that I could not say till I had seen my surveyor. A few days afterwards I received notice from the District Surveyor condemning the two end houses, and subsequently another notice with regard to the others. My surveyor, Mr. Dinwiddie, had previously had some correspondence with the Company on my behalf. I believe that all the houses in the row were built at the same time.

Cross-examined by Mr. MATTHEWS: The houses were conveyed to me for a term of 40 years, from 1860, at a rent of £35 for the whole row of 20 and a beer-house at the end, I paying also a premium of £160, and clearing off a mortgage of £350 to a building society. I have known the row since 1861. I do not remember tie-rods and iron cross-pieces being placed to the end cottages. So far as I know, the District Surveyor never visited the houses until he condemned them. Cronk became my tenant on Oct. 9, 1876, but did not then point out that No. 20 was leaning over. The old arch over the doorway had never been replaced by a new one. The ground on which the houses are built is about 3 ft. 6 in. higher than the garden at the back. Part of the boundary wall near the gasholder was pulled down and rebuilt because it began to give way. The rain water off the roofs of the cottages ran down a pipe along the front of the house into the drain. There was not a piece off the lower end of the pipe, and the water did not soak into the foundations. There is another row of cottages nearer the new gasholder than Blucher's Buildings, but the difference is only 2 ft. 2 in. They stood very well, but since the first gasholder was erected they have been thoroughly done up. They are not nearer the pumping-station than my property. After I first noticed the injury, I was laid up with rheumatic fever for several months, and therefore could not see what was going on.

Re-examined by Mr. COCK: The other row of cottages is not on the same level as Blucher's Buildings, but lower. I never noticed that the houses were giving before the Company's works began. The rebuilding cost £276 10s. 9d., and the rent of the houses is 3s. 6d. a week. They were unoccupied for about 14 months.

Mr. *Thomas Dinwiddie*, examined by Mr. COCK.

I am an architect and surveyor, and have been in practice about 16 years. In October, 1878, the plaintiff first consulted me about the damage done to his property. I inspected the cottages, and came to the conclusion that their final failure had been occasioned by the constructing of the gasholder. The fronts of the cottages on the right and left were fractured very much, and the end wall had failed considerably. They were cracked from the arches in the direction of the holder. There was a general subsidence of the end wall, but I do not recollect that there were any local cracks. The end of the two cottages showed a tendency to bulge in the centre, and overhung at the top. The cracks were of recent date. My clear opinion was that the giving way was to be attributed to the construction of the gasholder. I had no convenient means of obtaining information as to the way in which the holder was being erected, but I had no doubt that the injury was caused by the huge excavation made for it, measuring, I should think, 160 feet in diameter and 40 feet in depth. The excavation approached to within about 40 feet of the houses, and the draining of the subsoil by the pumping operations would necessarily tend to cause subsidence in the soil under the cottages. The settlements were not stationary, but were in active movement. I should think the houses were not less than 50 years old.

Cross-examined by Mr. MATTHEWS: Time would tell upon such property more than upon a higher class of buildings. The rest of the houses in the row that have not been pulled down are cracked in certain places, particularly the third house from the end. The tendency of the cracks there is also in the direction of the gasholder, and we may have further structures condemned. I do not know that we have arrived at the end of the mischief. Not many of the other houses are cracked. The wall of the cottage at the farther end bulges out. I think there were in the walls of the end cottages cracks which had been plastered or cemented up at some previous date. My judgment was no doubt influenced by the idea that the excavation was carried to a depth of 70 feet, but a depth of 40 or 50 feet would be quite sufficient to explain the settlements I saw. I assumed that the excavation would be made throughout the whole diameter of the gasholder; but even if that were not so, one of the main causes of the mischief—the tapping of the springs in the subsoil—would not thereby be prevented.

Mr. MATTHEWS: Supposing it was simply a trench, timbered and bratticed the whole way down, so that the outside did not move, do not you think the slipping would be prevented?

Witness: But the difficulty is to guarantee the absolute immovability of the soil.

A wall of great thickness built in a trench made on purpose to receive it?—It is impossible to build a wall so that it shall abut absolutely against the soil. There must be a space between the two, and if there is only a fraction of movement it is enough to cause mischief.

When the wall is built, suppose that puddling is put behind it, and the remaining space filled up with rammed earth, and only then the timber withdrawn?—Even if you succeed in keeping the soil from movement during the alteration, movement may take place the moment you remove the timber. I cannot say how much lateral removal of soil there must have been to cause the injury that I noticed. From the wall to the gasholder is about 47 feet, but the edge of the excavation was at least 3 feet nearer the wall. The subsidence was serious when I first viewed the property. I was then aware that not only had the first two cottages failed, but that the adjoining structures were giving way. I will pledge myself that there were then cracks in the other two. In my general practice I have had experience of subsidence caused by excavations in the case of sewer construction. I do not know geologically what are the strata in this case, and have not considered that point, because the thing appeared to me to be so clear and obvious. I do not remember seeing any fissures in the surface of the ground between the gasholder and the cottages. I suggest that there was a lateral subsidence of the subsoil, and that the top soil fell over. The pumping of the water would cause the lateral subsidence of the subsoil. I do not think that there would necessarily be fissures on the surface if the strata tilted over into the trench. If the whole surface had been paved or asphalted, fractures would have been seen.

Lord COLERIDGE: Do you mean to say that your experience of the slipping of a hill is that it does not break on the surface?

Witness: If the slipping is to a very marked extent, it would; but in this case the slipping was comparatively fractional.

Cross-examination continued: The parts nearest the trench would go more than the soil that was 20 feet off, but the fissures would be distributed all over the surface in such fractional crevices that they would not be discoverable in a soil like that. The land was originally marshy, and probably at one time was under water. Even your fence wall, which was built not as cottage property, but of great thickness, failed, and has failed again even since it was rebuilt. It is now bulging at the upper end. I have not tried it with a plumb-line, but I should think it bulges about 2 inches. Of course, if it was built on newly-laid earth, it would be very apt to give a little.

Re-examined by Mr. COCK: The fact that a brand-new wall, built of such materials as a wealthy Company can command, has failed, shows that the soil has become treacherous and unreliable, in consequence of the removal of the soil in the construction of the gasholder. The pumping would wash out the sandy particles of the subsoil. I am certain that on my first examination of the premises I noticed injury to the second houses from the end, and it afterwards became worse.

Mr. *James Stewart*, examined by Mr. COCK.

I am an architect and surveyor, carrying on my business in Coleman Street. I was formerly in partnership with Mr. Robertson, who is now in Australia. A year or two ago he examined these premises, and made a report upon them. I examined them again about February last. There was then a general subsiding of the two end houses. I thought there had been a slight slip in the ground, extending over some hundreds of superficial feet. The slip, in my opinion, was caused by the excavations of the defendant Company and their pumping operations, which would naturally cause a slight settlement of the land. I do not think it is possible to prevent a slip if you excavate. I never could, for it is a matter of the greatest difficulty. In making a trench, though it might be strutted and planked, yet when a wall is put in there must be space on the side of the land for the workman to use his arms. As a rule, the space is filled in with puddle as they rise—every foot or so. But a slip will take place, no matter how carefully it is filled in, or how much it is rammed. The slip would extend as far as the vibration of the pumping broke up the under strata. In this case the soil is loamy stuff and shingle, and a very great deal of that will go with the water which the pump draws out, and you cannot work the pump for many days without having to take it to pieces to clear it all out. It would require a very large slip to cause any fissure on a flat surface like this,

which only slopes 2 ft. 10 in., or something of that sort. A very small slip would cause the houses to slip, without any fissure appearing on the surface, because they are only very slightly-built houses, with 9-inch walls. The other houses in the row were old houses, and some of them had cracks and bulges; but taking them all round, they were in a fair state of repair. If they had not been disturbed, they were in a condition to stand for another 50 or 60 years without being condemned.

Cross-examined by Mr. MATTHEWS: I do not think there is any lateral slip in this case, but only a settlement of the soil downwards through the pump drawing out the sticky particles. It is like throwing a stone into water. You may not see the ripple, but there is one.

Mr. MATTHEWS: Assume a sewer 40 feet deep. Do you mean to say that there would be a settlement more than 40 feet away?

Witness: No; for this reason. Making a sewer is quite a different matter from building a wall in a trench. In the case of the sewer, they build the drain from inside—they do not leave a space the width of the hand between the wall and the outer brim. Of course, they puddle wherever it is required, but they leave so small a space that there is very little need for that. Building a sewer is quite a different matter from building a retaining wall. They cut as true as possible for a sewer.

Then your theory is that it is the pumping that has done the mischief here?—Yes; and partly the natural slip of the land through the excavation.

May I take it that you consider all the mischief was done by the pumping?—Yes, you may. The old end houses were still standing when I first saw them. In the houses now standing there are indications of the settlement that takes place immediately after building common property, and also indications of pointing; but there were no more cracks in the end houses than in the others. They had all been pointed up. In No. 1 the door-frames were separated perhaps 2 inches from the reveal; but it was a new injury, not an old one. There was no old injury that I saw. There was no pointing in the gap between the door-frame and the reveal. There was a crack in No. 2, over the window; but if it had been pointed, the pointing had fallen out. I did not take any notes of what I saw. I was in the neighbourhood on another matter, and I did not think I should be called in this case.

Re-examined by Mr. COCK: The general condition of the houses that have had to be pulled down was about the same as that of the others in the row, with the exception of this heavy settlement. I had no doubt whatever that the heavy settlement was a recent one.

Mr. *Edward Field*, examined by Mr. COCK.

I am an Associate of the Institution of Civil Engineers, and a Member of the Institute of Mechanical Engineers. I have been in the profession 30 years, and have been a Consulting Engineer for the last 15 years. Last Thursday I made an examination of the locality in question, and noticed the wall between the Gas Company's premises and the ground on which the cottages are situated. I have heard the evidence as to the cracks and the giving of the houses, and I am decidedly of opinion that a subsidence has taken place, and that it has been caused by the abstraction of the sand from the strata by pumping. The wall has been repaired in exactly the spots where the subsidence would take place. The effects of the subsidence would have been likely to reach towards Blucher's Buildings. I know the way in which the gasholder would be constructed. I have not seen a section of the strata, but I believe that the whole of the subsoil there is composed of river sand and clay in strata. The effect of pumping an immense quantity of water from this trench would be that the sand would be gradually drawn out of the water-bearing strata, and this would allow the supersoil gradually to subside. The sand would be first of all brought from the entrance, and the effect would gradually spread back farther and farther according to the time that the pumping was continued. I understand now that the pumping was continued for eighteen months; I thought it was only for nine months.

Mr. MATTHEWS: You are quite right; it was nine months.

Mr. COCK: Have you formed your opinion on the supposition that it was continued for nine months?

Witness: Certainly. If the operation I have described had taken place, it would be so gradual that you would not be likely to see any fissure on the surface. A shower of rain would be sufficient to obliterate all fissures. I do not think there can be a doubt that the subsidence of the houses arose from the gradual sinking of the surface.

Cross-examined by Mr. MATTHEWS: The length of time during which the subsidence would take place depends entirely on the condition of the strata; but I should imagine that it has hardly ceased yet. I have no acquaintance with the strata of this locality, except my general knowledge of the district. I simply know that it has been in ages past the bed of the river, and probably there is in that locality a large quantity of river sand, covered by made earth and the general supersoil of the neighbourhood. If there were not a bed of sand there, my theory would fail; but when I say sand I mean water-bearing strata. I should not be surprised if the effects of the subsidence reached to 100 feet all round, if the water-bearing strata extended to that distance.

Mr. MATTHEWS: Suppose the pumping was carried on for nine months at the rate of 20,000 gallons an hour, how far would the effect extend then?

Witness: It is impossible to say accurately. If I had been at the works at the time the operations were going on, I should have judged of the quantity of sand coming in. I saw the other set of cottages opposite Blucher's Buildings, near the trench, but I merely casually observed them.

Take it from me that those were not injured in consequence of the works of the Company; how do you account for that?—In this way: A subsidence took place when the former gasholder was made, and the sand having been already pumped out of the immediate strata, there is no cause for them to go any farther. Both gasholders may be within 100 feet, but under those cottages there may not be water-bearing strata.

Re-examined by Mr. COCK: It is quite impossible to say how far the water would come from, but the sand would not come from the same distance until the front sand was taken away.

Lord COLERIDGE: This pumping is merely a form of draining?

Witness: Yes.

You do not mean to say that drawing away the water necessarily lets down the whole superincumbent strata?—Providing it is a water-bearing stratum.

You do not mean to say that drawing the water out of a particular stratum, whether by ordinary draining or by pumping, does necessarily let down the water above it?—Under such conditions as these.

But you do not know the conditions?—I take the conditions to be that a trench is sunk some 40 feet deep, and that the water-bearing strata are cut. Of course, there may be springs rock-bound.

Lord COLERIDGE: It is every day's experience that you can go into a country and drain without interfering with the surface.

Mr. *Felix Bell*, examined by Mr. COCK, said that he was formerly an auctioneer, valuer, and estate agent, and had the management of the greater portion of the Roan Estate, on which the cottages were built. He was constantly in the habit of seeing these houses. He first had his attention directed to the cracks a little prior to Christmas, 1877. That was after the defendants began their works. There was then a slight crack over the archway of the door of No. 20. He did not notice any other cracks at that time. Towards the end of 1878 he saw that the cracks were getting worse, and he advised the plaintiff to have the houses shored up, but they continued to get worse till they had to be pulled down.

Cross-examined by Mr. MATTHEWS: He did not go there for the purpose of looking at the cracks, but being a friend of the plaintiff he sometimes accompanied him when he went to collect his rents.

Mr. *Joseph Liddiard*, examined by Mr. COCK, said that he was a surveyor, and lived at New Cross Road, Deptford. In the month of January last he was instructed to survey this property, having previously surveyed it in April, 1877. At that time the houses were perfectly sound, and he did not notice any cracks. At the two end houses there were ties, which were put in about the year 1851, and had not been interfered with from that date. In January last he noticed that the two end houses had sunk down bodily. On one side the arches over the entrance doors had gone down a full half course of bricks. The house at the back of No. 20 had also sunk. He was most positive that this had happened since his visit in 1877. In April, 1877, the end houses were in the same condition as the rest of the row.

Cross-examined by Mr. MATTHEWS: In 1877 he went to value the property for an advance by a building society. If there had been any cracks there then he would have reported them. There were not even any cracks pointed up. He noticed no difference between the ties in the year 1853 and in 1879.

Mr. *Samuel Coates*, a cook and confectioner, of 319, Edgware Road, said he was owner of Blucher's Buildings for about three years, commencing in 1873. He did not know of the outside walls of the end houses being cracked at the time he had them. He was there sometimes two and three times a week, having a private house at Greenwich.

William Tarlett, a barge porter, said that he lived at No. 1, Blucher's Buildings from June, 1876, to November, 1878. Before the commencement of the Company's works he did not notice anything the matter with the house. About two months after the pump started he noticed a little giving of the ceiling from the party wall. The opening became larger, and then the house was condemned and he left.

John Connor, cellarman, said he commenced renting No. 20, Blucher's Buildings in 1875. Before the new gasholder was being put in he did not notice any cracks in the house. After it was put in he noticed cracks at the end of the staircase to the top of the roof. These cracks commenced to show themselves about October last year.

Mrs. *Susan Robinson*, of No. 3, Blucher's Buildings, said she formerly lived at No. 2. After the works for the new gasholder commenced she noticed the walls between No. 1 and her house had given way. The vibration of the pumping-engine used to shake the premises. The crack became larger, and when the houses were condemned she had to leave.

Mrs. *Caroline Robinson*, who formerly lived with the last witness, gave similar evidence.

This closed the plaintiff's case.

Mr. MATTHEWS then addressed the jury for the defendants. He said in this case there was some small amount of fact, but a great deal of theory. That cracks existed in the houses was beyond all doubt, and it was part of his case. He would show the jury that for 20 or 30 years the houses, especially the end one, had been in a state of dilapidation—so bad that the Surveyor of the Board of Works had more than once come in; and that, by his orders, not only in 1853 but in 1870, struts were put up to prevent the buildings falling down. What the cause might have been was not difficult to conjecture. The jury had seen what remained of the old houses, and they would have noticed that they were built as cottages of that class were built in the slightest way, that would enable bricks and mortar to keep out wind and weather. Those farthest removed from the gasholder had bulged and cracked over the doorways and right across the window-sills, in some instances from the top to the bottom. There was a cause of mischief specially present at the end houses, which, no doubt, had hastened their fall. Their existence had not been prematurely cut off; they had been sinking for years. The end houses stood at the edge of a slope which the ground formed from the foundations of the houses towards the boundary wall of the Gas Company's premises. In addition to the slope there was the pipe projecting down the side of the corner house, No. 1, through which, owing to the carelessness or mischief of some of the tenants, the drainage water from the roof ran into the foundation at the base, and that going on from year to year would weaken the foundation considerably. At any rate, be the cause what it might, it certainly was not the gasholder. He would prove that the condition of the houses had been dangerous for years, and that long before the gasholder was commenced they narrowly escaped condemnation, and were only spared on condition of their being tied up together with struts and cross-pieces. Cronk was mentioned by the plaintiff as a tenant of one of the houses, and he would be called and would tell them that in 1876, before the gasholder was thought of, he lived in No. 20, and that the house was in such a condition that he was quite uncomfortable about living there. He consulted Mr. Taberrer, who did not then feel prepared to recommend the house being pulled down; but Cronk was instructed to repair it as well as he could. He did repair it, and rebuilt a portion of the wall at the end, near the gasholder, and also pointed and repaired the cracks that existed in the front walls. At that time the house had so far sunk that the laths of the ceiling were drawn away from the party wall, and the joints of the brickwork had also parted upon the southern side of the ground floor—injuries which, if Mr. Liddiard was to be trusted, did not exist at all. He would prove by witness after witness that not only in the end cottages, but in other cottages, there were injuries of a serious kind existing before the gasholder was commenced, and those facts would of themselves be sufficient ground upon which to rest his case. If he could show them that the cottages were tottering to their fall, and had been the subject of repeated and close attention by the Surveyor of the Board of Works, as to whether he ought not to order them to be pulled down on account of their being unsafe, it was idle to speculate upon the possibility of some additional vibrations or shaking by the erection of a gasholder. What did the defendants really do? They did not build the gasholder themselves, but they employed contractors—Messrs. John Aird and Sons—who were perfectly competent to carry out the work. The way in which it was done was this: A trench was dug, not 70 or 80 feet deep—that was one of the ludicrous exaggerations of the case—but to a depth of 38 ft. 9 in., of a circular form, leaving all the centre of the ground untouched. When the trench was built, the circular wall that retained the water in the holder was complete. That circular wall was built about 4½ or 5 feet thick at the bottom, and all but touched the outer face of the trench. Width enough was left between the outside wall and the trench to put in puddle, and a space of something like 2 ft. 6 in. was left between the puddling against the uttermost face of the wall, and the perpendicular line of the trench. The whole of the trench was strutted and timbered for the safety of the men at work in it, and it was impossible that they should allow any earth to go in. When the wall had been completed, earth was rammed in, and, therefore, the whole possible element of lateral

subsidence was such compression as could possibly take place of the made earth which was rammed in. This was rammed in as tightly as possible for the safety of the wall, which the contractors were responsible for. It could not be denied that theoretically there was a possible compressibility of that slight layer of made earth, but that any lateral sliding took place was, he thought, almost given up by the scientific witnesses for the plaintiff; because there was a wall existing between the holder and the cottages. The Company's Engineer assumed that there had been cracks taking place in the wall owing to subsidence. He was a gentleman who did not know the premises before the gasholder was made, and he was wrong in his assumption. They would remember where the new brickwork ran down into the old work. The old brickwork was a wall forming the foundation of the former fence. The old wall ceased altogether at a certain point, and from there the fence was carried on as a paling only. So little subsidence was there, that although it was a wall of very great age, there was no occasion at all to take it down; but when the gasholder was complete the Company actually built their new wall upon the old wall, which had not sunk or given way in the slightest degree. He relied upon this fact alone as conclusive against the slipping theory and the subsidence theory. The wall was nearer to the gasholder than the cottages in question, and if there had been anything like subsidence or lateral slipping, it must have affected the wall first, and more than the cottages behind it. It was perfectly true that a little piece of the new wall was deflected slightly from the perpendicular; but that was due not to any subsidence in the surface, because the wall was built long after the cottages were removed, but because there was made earth on both sides of it. He therefore asked the jury to put their foot upon the wall, and with a single fact like this before them, to discard all the theories that had been set up. There was on the cottage side of the wall an open drain, which many years ago was turned into a sewer, and just in the angle at the boundary wall there was a man-hole. If there had been any subsidence or lateral slip, the sewer would have gone before the cottages, and more than the cottages, because it was nearer to the cause of disturbance. It had remained perfectly safe; and why? Because it was well built. Why did the cottages go? Because they were tumble-down old things, and would have gone in any event. Theories had been presented to the jury, but he would show them facts—cracks in abundance years and years before the excavation work began. Mr. Dinwiddie, in his evidence, had fluctuated between two theories. He hankered a little after the theory of a lateral slip; but being driven from that, he had recourse to a theory of a lower stratum pulled out, leaving the others to sink. It came out ultimately, however, that in reality it was the withdrawal of water, and that he assumed that when the water was withdrawn a good deal of sand came with it, and that a quantity of sand having gone from below, the upper strata would subside slowly and gradually. This was a possible theory, and it was a theory to which no human being could give an answer, because no one could say what was the position of underground water; and hence the law had said if underground water was withdrawn by pumping operations in draining land, no remedy would accrue to the person injured thereby. He did not think this doctrine had ever been in doubt. If it was possible to withdraw a great mass of water from a whole stratum, and that stratum was very friable and soft, a good deal of it might come away with the water, and so by degrees there might be a sort of cavity left, and the strata above would gradually subside and sink. It was obviously, however, a mere theory in this case, and the gentleman who propounded it did not pay the jury the respect of telling them what the strata were. His theory rested entirely upon having a quantity of sand; but he (the learned counsel) supposed it would equally hold good if there was merely confined between water-tight strata a bed of water which was drawn out. The theory to which the plaintiff's witnesses ultimately pinned themselves was the pumping theory, and to the pumping theory his best answer was that the law gave no remedy for it; and therefore, he was not concerned to dispute it. What difference had any witness drawn between the cottages in Blucher's Buildings and the other cottages? There was no reason for saying the strata underneath them were different. The other cottages were, perhaps, not very good houses, but at any rate they were rather more substantial than the plaintiff's and in their case there has been no subsidence, slip, vibration, or anything else to injure them. With reference to the pumping, the fact no doubt was that there was a vast deal of pumping at the rate of 20,000 gallons an hour, which went on for nine months before the trench was dry enough to lay the foundations. The pumping commenced on the 26th of June, 1877, and continued till about February or March, 1878, the work being completed in May of that year. It was a little remarkable, therefore, that there was no complaint until September, 1878, and the complaint was then confined to the four houses at the end—Nos. 1, 2, 19, and 20. This complaint was not made until six or eight months after the pumping had stopped. Of course it was difficult to grapple with these pumping theories, and to know, if the evidence for the plaintiff was to be believed, how many months elapsed after the pumping had ceased before the builders could consider themselves safe. However, as he had said before, the very best answer to the pumping theory, if it was true, was that the law did not make the Company liable. In all probability it was not true, and all the facts of the case showed that the operations of the Company did no injury that any sensible man could appreciate. The shaking of a steam-engine working a set of pumps near cottages of this sort—shaking them till they fell—was not the injury complained of. But, as he had already said, these houses were very old and rickety, and for aught he knew the mere working of the steam-engine might have caused the old cracks to re-open, or fresh ones to form; but the Gas Company were not to be made responsible because the houses were like houses of cards, and would not bear even the vibration of a pumping-engine at a distance from them. He would now call his evidence, and in the result was satisfied that the jury would return a verdict for the defendants.

Mr. *Benjamin Taberrer*, examined by Mr. PITT LEWIS.

I am a surveyor, carrying on business at No. 10, Coleman Street. I am District Surveyor of the Metropolitan Board of Works. My attention was first called to these houses in the latter part of 1870 or the beginning of 1871. The end wall—the wall forming the ends of Nos. 1 and 20—was considerably bulged. In consequence of that I called upon the owner to put in some iron ties. There were some ties previously put in at the upper part, but those which I had fixed were more towards the middle of the wall. In my judgment the wall was not safe without some such support. I should say that the reason of the wall going outwards was in consequence of the foundation not being sufficiently deep, and the proximity of the ditch. The ground sloped away from the wall towards the ditch. I frequently visited the cottages, because I looked upon them as of a suspicious character. In October, 1878, my clerk reported to me that they required attention, and in consequence I went down on the 9th of October. I found the two end houses in a dangerous state, and the two next appeared to be in a very similar condition. I condemned the whole four. The walls were full of cracks and fissures. The end walls were very much bulged, and the ties seemed to have lost their hold. The cracks must have been there long before I saw them in 1870. When a house begins to crack, my experience is that it goes on with gradually accelerating speed until it comes down.

Mr. COCK (in cross-examination): In your opinion, were these houses brought down by the pumping operations of the Gas Company?

Witness: They were not brought down at all.

Was their end hastened by the operations of the Gas Company?—I think the operations of the Company slightly increased their defective state by the withdrawal of the water from the subsoil. That is my opinion.

And also by taking some of the soil itself with the water?—No; I do not think any portion of the soil under the houses would be withdrawn at that distance from pumping operations.

I suppose it would draw a good deal more towards the mouth of the pump, and less farther off?—Oh, yes.

Would it cause the surface to subside, supposing that took place?—The withdrawal of a vein of running sand would certainly cause subsidence of the surface. It would not be at all surprising if no fissures were seen on the surface when pumping was going on at that distance from the pump. I think it very likely there was some subsidence of the soil caused by the pumping, and I believe two ties were inserted by my direction at the level of the ground-floor ceiling. They were attached to the timbers of the house, and, as the premises became worse, the ties as well as the timbers all drew away together.

Re-examined by Mr. MATTHEWS: I think it is very likely that the pumping operation increased the defective state of the buildings. Other contributory causes were their bad original construction. They were evidently built before the present Building Act was in force. I should say they must be nearly 100 years old. I think it is highly probable that the houses would have got into the state in which I found them in 1878, even if the Gas Company's operations had not taken place. I did not notice anything about the houses which would not be consistent with natural decay, especially bearing in mind the position of the end wall with reference to the bank.

Thomas Winch, a jobbing bricklayer, living in Greenwich, said he had known Blucher's Buildings for 47 years. The foundations had been sinking ever since the ground was removed at the end. He repaired the cracks in the end houses in 1867. He also plastered the ceilings where they had parted from the walls, and put in longer laths. On the south side a girder had drawn right out of the wall, and sunk down, so that he was afraid to walk on the floor. He went underneath the floor and propped it up. It was all due to the continuous sinking of the earth. The last job he did was seven years ago. Then the staircase was all falling, and he propped it up.

John Tranter, a greengrocer, living at Greenwich, said the houses were at one time the property of his father, and on his death witness took some of them. He could remember them for over 40 years. They had always been in a bad state, and 25 years ago he had to put a front in one of the houses for fear the Feoffees of Ronan's Charity would take the property away from him. He had noticed the party wall between the two end houses giving way towards the ditch. In 1862 ties were put in, and then the houses began sinking and sinking. It cost so much money that he could keep them no longer, and so the Trustees took possession of them.

William West, a jobbing bricklayer, living in Deptford, said he had known Blucher's Buildings for about 17 years. They were in a very bad condition when he first knew them. The walls were cracked, and the owners kept pointing them up for years. About nine years ago he put in the iron ties. The flooring had then sunk about 6 inches beyond the level. The party wall had given from 4 to 6 inches between the houses Nos. 1 and 20. The stairs had come away 4 inches. He filled the gap with brickbats and mortar, and plastered over it inside. The outer wall was also cracked. The cracks became larger and larger.

William Ewing said 11 years ago he lived at No. 1, Blucher's Buildings. The party wall between Nos. 1 and 2 was opened from ½ to ¾-inch. The crack extended about 4 feet. The outside wall had given way from the end part of the window to the top of the doorway.

Josiah Cronk said he occupied No. 20, Blucher's Buildings, in September, 1876. It was in a very dilapidated condition, and he drew the attention of the surveyor to it before he moved in. By Mr. Phillips's orders he took the wall down and rebuilt it for about 4 feet. The wall had left the roof about 5 inches at the top. The ceiling had also drawn away from 4 to 5 inches from the party wall. He did the repairs at Mr. Phillips's expense. The floors were 7 inches out of the level, dipping towards the gasholders, and 3-inch blocks had to be put under the bed-posts to make them right. He left in August, 1878.

The JURY here intimated that they did not desire to hear any further evidence.

Lord COLERIDGE: I presume by that you have made up your minds in favour of the defendants?

The FOREMAN: We have.

A verdict was accordingly entered for the Defendants, and his lordship certified for a special jury.

LEAMINGTON BOROUGH PETTY SESSIONS.—WEDNESDAY, DEC. 17.

(*Before Major* EDLEMAN *and Mr.* J. FORD.)

ALLEGED NUISANCE BY A GAS COMPANY.

The Leamington Priors Gas and Coke Company were summoned to answer a charge of having, on the 9th inst., wilfully allowed, in the carrying on of their business of the manufacture of gas, a certain nuisance to exist, by permitting an offensive smell to arise therefrom, and certified to be a nuisance by ten residents in the neighbourhood.

Mr. E. WRIGHT appeared for the Company.

Mr. *Smith*, the Inspector of Nuisances, said that about a quarter past seven on the night of the 9th inst. he received information of an abominable smell existing in High Street, Clewer Street, and the neighbourhood. On going along High Street and up Wise Street he found the air impregnated with a very foul smell. On the canal towing-path he met police-constable Hopkins, and asked him if he noticed any smell. He said he did, and that he thought it came from the gas-works. He was of the same opinion himself, and they went together to the gas-works. When they had entered the yard they there saw Mr. Cross, the Secretary and Manager. He said to Mr. Cross, "There are some horrible smells in the streets to-night, which I suspect come from your works." Mr. Cross replied, "Are you sure it is not your own drains?" and asked witness to go with him to the sewer ventilator at the gate and smell the stench from it. He knelt down over the ventilator, but could not perceive any offensive smell. The constable said the same, but Mr. Cross said he could detect a bad smell from the ventilator, and called two of his men, who also said they noticed the smell. Then witness went round the works to the purifiers, where they found an effluvium arising from one of the purifiers. That smell was exactly the same as in the streets. He said to Mr. Cross, "This is the nuisance we have in the streets; the smell is exactly the same." Mr. Cross said, "If this is a nuisance, it must be turned off." Mr. Cross accordingly ordered the use of the purifier to be stopped, and witness and Hopkins left the works, and went on to the towing-path

where they had been before, but did not detect any smell at all. There was a sort of steam arising from the purifiers when he first saw them.

Cross-examined by Mr. WRIGHT, witness said that he did not notice the smell when in the works until he got near the purifiers. He did not go round to get signatures to the complaint.

Police-constable *Hopkins* gave confirmatory evidence, and said he had noticed the smell for an hour before he was spoken to by Mr. Smith. He added that he had himself been employed at the Coventry Gas-Works, and had to attend to the purifiers, and had then noticed the same smell arise from them. His experience enabled him to say that, by proper care, the nuisance could, to a great extent, be avoided. Mr. Cross told Mr. Smith that if the smell should arise again, if he could call at the works it should be stopped.

Cross-examined by Mr. WRIGHT, he said he got within six or seven yards of the purifiers before he noticed any smell.

Chief-constable *Laud* spoke to having detected the offensive smell, which he traced in the direction of the gas-works, and then sent a constable to inform the Inspector of Nuisances.

Mr. *James Spilsbury*, a chemist, spoke to having been annoyed by the smell, which was chiefly composed of sulphuretted hydrogen. It was so offensive that windows had to be closed.

Mr. WRIGHT held that, the information being laid under the 114th section of the Public Health Act, 1875, the Company could only be convicted on proof that they had not done all in their power to prevent any nuisance. They had done all in their power, and had been sincerely anxious for years to render smells—which must arise from the manufacture of gas—as slight as possible. Previous to 1876, there were various complaints, and there could be no question the lime used in purification did emit an offensive smell when the boxes containing it were emptied. The Company, therefore, consulted Dr. Odling, of Oxford, who was an eminent chemist, especially connected with gas-works, and he inspected the works and reported thereon. He advised a process then being tested at Bow, which was found so satisfactory that it was adopted. Witness explained how the smell from the lime was thus destroyed. It was admitted, he said, that the smell could not be perceived except close to the purifier and this accounted for its not having been detected and stopped by the man in charge. As there had only been two complaints since this new process was adopted—and one was due to frost—he thought the justices would be satisfied the Company did all in their power to prevent nuisance, and if they were of that opinion they could not convict.

Mr. *Cross*, who came to the gas-works in 1873, and was appointed Manager in 1876, spoke to Dr. Odling having been consulted in consequence of complaints of nuisance, and he made a report. By his advice the process of purifying the lime by passing air through it, and then purifying the air with oxide of iron, was adopted. The process was capricious, but when it worked properly there was no smell. On the night in question there was no smell until they got near the purifier. The smell was due, in his opinion, to the purifying material having been frozen, and to having thawed speedily at one spot. There had only been one complaint before for the last two years.

In cross-examination, the witness said there was more effluvia than he liked on the night in question, but he did not perceive the smell until he put his nose near the purifier. He attributed the smell to the oxide having been frozen.

Matthew Cunningham, yard foreman, described his duties, and said that at half-past six on the night in question he tested the purifier with lead paper, and there was not the least discoloration, which would have been the case had sulphuretted hydrogen been escaping.

In cross-examination, he said there was no smell whatever up to a quarter to eight. That was before the Inspector of Nuisances came.

Mr. *J. S. Baly*, the Corporation Medical Officer of Health, who was in court, said, in reply to Mr. WRIGHT, that the nuisance which arose on the works last February was due to an accident.

The MAGISTRATES, after conferring privately with their Clerk, said: The Bench are of opinion that the Company have been in the habit of taking every ordinary precaution to prevent offensive smells, and they will not convict on this occasion; they think, however, that this was a proper case to be brought forward. They are of opinion, with a severe frost like that of the 9th inst., the Company should have used a little extra precaution. They have no doubt, after the evidence given, that the smell arose from the defect in the purifier, caused by the action of the frost.

Mr. WRIGHT said he would communicate to the Company the decision of the Bench. He was sure they would in future use every possible precaution during frosts.

DEATH OF MR. HENRY COMPIGNÉ.—We have received intimation of the death, on Sunday, the 14th inst., of Mr. Henry Compigné, who had been Secretary and Treasurer of the Gosport Gas and Coke Company for the last 15 years. The deceased was nearly 75 years old. He was the son of Mr. David Compigné, who joined the late Mr. T. G. Barlow in the formation of the Gosport Gas Company; and his firm (Messrs. D. H. and H. Compigné) also promoted the present Gosport Water-Works Company, besides being connected with most of the public companies in the neighbourhood, and acting for the Local Authority. His mother was a daughter of the late Mr. Harry Baker, of Pall Mall and Beaconsfield, one of the original Shareholders in the Chartered Gas Company. He was senior solicitor on the rolls in Hampshire, and was connected with very many of the local charities.

DEATH OF MR. JOHN LESLIE.—The death is announced, on the 15th inst., in his 85th year, of Mr. John Leslie, who has for many years past represented the parish of St. George, Hanover Square, at the Metropolitan Board of Works, and has, at times, taken such an active part in reference to the gas question. This subject he was specially qualified to handle, having in his earlier years devoted, in his business, much time to the science of gas lighting. As far back as 1845, he took out a patent for "Improvements in the Combustion of Gas;" this was followed by another, two years afterwards, for "Improvements in the Combustion of Gas for the Purpose of Light." He then turned his attention to the manufacturing department, and devised several improvements which were the subjects of a series of patents, the last of which was granted in 1861. Mr. Leslie had been in failing health for some time past, and died, as before stated, on the Monday of last week.

THE LOWER THAMES VALLEY MAIN SEWERAGE BOARD.—Last Wednesday a numerous deputation of persons who consider that their property would be injured if the scheme of the Lower Thames Valley Main Sewerage Board were carried out, had an interview with the President of the Local Government Board. Mr. Sclater-Booth said he understood the reason so large a quantity of ground was required for the sewage was that a nuisance, such as sewage, which would be imperceptible on 1000 acres, would be intolerable on 100 acres. The deputation had placed before him in writing some very elaborate statements, which he would take into consideration, and give them his answer in writing. At present he would only say that some means of getting rid of the sewage besides the river must be resorted to, and he thought the whole scheme should be examined with forbearance and liberality.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

METROPOLITAN BOARD OF WORKS.

THE AMALGAMATION OF THE SOUTH METROPOLITAN AND PHŒNIX GAS COMPANIES.

At the Weekly Meeting of the Metropolitan Board of Works on Friday last—Sir J. M. HOGG, M.P., in the chair—a report was presented by the Works and General Purposes Committee on a letter from the Board of Trade, enclosing a copy of the scheme for the amalgamation of the South Metropolitan and Phœnix Gas Companies, and asking for the Board's observations thereon. The report was as follows:—

Your Committee, in pursuance of the resolution of the Board of the 28th ult., have considered the letter from the Board of Trade, with a copy of a proposed scheme for the amalgamation of the South Metropolitan Gas Company with the Phœnix Gas Company, and asking for this Board's observations thereon.

By the South Metropolitan Gas Company's Act of 1876, the initial price of gas is fixed at 3s. 6d. per 1000 cubic feet, and the effect of the proposed scheme would be that this would be the initial price for the whole of the amalgamated districts.

Your Committee, having regard to the price now charged to the consumers by the South Metropolitan Company, are of opinion that an initial price of 3s. 6d. for these districts is too high, and upon this ground they beg to recommend that the proposed scheme be objected to by the Board, and that a reply be addressed to the Board of Trade accordingly.

Mr. ROGERS, in moving the adoption of the report, said that under the City of London Gas Act of 1868 the several Gas Companies of London were allowed the privilege of amalgamating together under the advice and regulations of the Board of Trade. The Companies formerly supplying the districts in the north of London had nearly all amalgamated with the Chartered, or The Gaslight and Coke Company, and only the Commercial Company now remained independent. Under the sliding scale the initial price was fixed at 3s. 9d. per 1000 feet, while in the south of London, mainly through the exertions of the Board and the District Boards of Lambeth, Wandsworth, and Camberwell, when the South Metropolitan Company applied to Parliament they were compelled to make their initial price 3s. 6d., the regulations with regard to the dividends being the same as those for the north of London. The consequence had been that in the South Metropolitan district very great advantage had accrued to the consumers of gas, and the price there had been 3s., while the Shareholders received a dividend of 11¼ per cent. During the last few months an amalgamation had taken place between the South Metropolitan Company and the Surrey Consumers Company, the latter having previously, under the Metropolis Gas Act of 1860, power to charge 4s. 6d. for 12-candle gas. The consequence of the amalgamation had, of course, been very advantageous to the Surrey Consumers district, which was now supplied with 16-candle gas at 3s. per 1000 feet; but the residents in the former South Metropolitan district were prejudiced, by having now less probability of a further reduction. The consumers there, however, had not wished to impede the amalgamation, because they recognized the benefit which it would confer upon the consumers in the Surrey Consumers district. But by the present proposal a very much larger area would be brought in, and from the speech of the Chairman of the Phœnix Company, at a meeting on Wednesday, it appeared that the cost to that Company of making the change would be a loss of £26,000 a year on their receipts for gas. Looking at the fact that the South Metropolitan accounts for June last show that this Company were able to add nearly £50,000 to their reserve-fund, and pay 11¼ per cent., though only charging 3s. per 1000 feet, it rested with the Board to decide whether they would press upon the Board of Trade to alter the initial price. At all events, the Board would endeavour to protect the interests of the consumers. In the north of London there was a large district which formerly paid only 3s. per 1000 feet, but had paid 3s. 6d. since the amalgamation; so that the consumers there had not benefited by the change. He was at a loss to understand why the consumers in the South Metropolitan district should, by amalgamation, be robbed of the advantages which they now possessed. Still, he was not one of those selfish men who would say that other districts should not be benefited, so long as the interests of the consumers were fairly protected.

Mr. RUNTZ said if the motion brought up by the Works and General Purposes Committee were carried, the Board would appear very ridiculous in the eyes of the Board of Trade. The Board had long approved of amalgamation, and when they began to endeavour by parliamentary action to improve the condition of things in the Metropolis, there were nine different Gas Companies on the north, and four on the south side of the Thames. On the north side amalgamations had taken place. On the south side the South Metropolitan had amalgamated with the Surrey Consumers Company, and now it was proposed to include the Phœnix. Before Parliament the Board had fought for the sliding scale and auction clauses, and the person who introduced the sliding scale was the Engineer and Secretary of the South Metropolitan Gas Company. The matter was well fought out before the House of Commons, and no abler evidence was produced upon the subject than that given by the late Mr. Newton. The initial price on the north side was 3s. 9d. per 1000 feet. If the Companies charged a penny more, they lost the power of paying 10 per cent. dividend. For every penny increase in price they lost one-quarter per cent. dividend, while for every penny decrease in price they were entitled to divide one-quarter per cent. more. On the south side of London the initial price was 3s. 6d. per 1000, yet it was now proposed to say to the Board of Trade that this was too high. It must be borne in mind that the Board of Trade had no power whatever over the initial price, and any alteration must be made by further application to Parliament; but it had been hoped that the initial price had been fixed, and that the expense of more opposition in the House of Commons would thus be saved. Looking at the question as a Metropolitan one, it was clearly of great importance to the people on the south side of the Thames that the Companies should be amalgamated, and if the Phœnix were now united with the South Metropolitan Company there would be one charge on the north of the Thames and one on the south. At present the Phœnix could charge 5s. 6d. per 1000, but when once the amalgamation was completed they would not care to go beyond the initial price of 3s. 6d. per 1000. There really did not seem very much to complain of in the scheme. With regard to a reserve-fund, the Companies on the north side were entitled to one, and The Gaslight and Coke Company had a reserve of something like £134,000, which was a sort of insurance-fund; for in the event of coal being dear, and the manufacture of gas becoming more expensive, instead of raising the price of the gas they could keep up their 10 per cent. dividend out of the reserve. Clearly this was a benefit to the consumers in dear years, because it prevented the rise in price which would otherwise follow. Under these circumstances, it seemed to him that the Board would be going in the wrong road if they tried to stop the proposed amalgamation because the initial price of gas was too high. He would, therefore, submit as an amendment—"That the Board of Trade be informed that this Board has no specific objection to offer to the scheme of amalgamation, provided that the Board of Trade will see that the interests of the gas consumers are not prejudiced, and that the compensations to retiring

Directors and Officers, and other financial arrangements incident to the amalgamation, are made upon the most economical terms."

Mr. SELWAY seconded the amendment.

Mr. FOWLER said it was the duty of the Board either to express approval of the proposed terms of amalgamation, or to give specific reasons why they disapproved of them. He could not agree that Parliament had ever fixed an initial price of 3s. 9d. for the north and 3s. 6d. for the south; but in individual instances, when Companies came before them, Parliament named the initial price. To say that Parliament had laid down a principle that on the north side of the Thames the initial price should be 3s. 9d. and on the south side 3s. 6d. per 1000 feet, was contrary to what he understood as the meaning of what had been done. It was perfectly clear that the South Metropolitan Company, after amalgamation with the Surrey Consumers Company, were able to supply gas at 3s. per 1000, and to pay their Shareholders 11½ per cent. Could the Board, therefore, think it fair to allow the amalgamation with the Phœnix to take place, and the initial price to be fixed at 3s. 6d.? Such a thing would lead to a confederation of monopoly more dangerous and more suicidal, as regarded the interests of the consumers, than even the former state of things. It was the duty of the Board to give expression to their view if they thought the price too high. He believed that the manufacture of gas was every day becoming more profitable to the Gas Companies, in consequence of the enhanced value of the residual products, and in time the actual cost of gas-making would be reduced to a minimum. Would the Board then stand still, and not see that the ratepayers and consumers had the benefit? The Company had an insurance-fund of £150,000 put by out of profits.

Mr. HARRIS: A reserve-fund.

Mr. FOWLER said he would call it a reserve-fund taken out of the profits made by the manufacture of gas. That being so, he thought the proposed initial price too high, and that 3s. would not be too low. His Vestry had the matter under their notice on the previous evening, and they considered that the initial price for the whole southern district should be 3s., which would be sufficient to allow the Companies to pay 10 per cent. dividend. The Board had now the opportunity of representing these facts to the Board of Trade, and he trusted that they would not, by a sidewind such as the amendment, undo all that which their Committee, after careful consideration of the subject, had agreed to recommend to the Board.

Mr. RICHARDSON said he quite agreed with Mr. Runtz that the Board had expressed approval of the amalgamation of Gas Companies, but that approval was given upon certain terms, though, of course, the conditions which were suitable six or seven years ago might not be equally applicable at the present time. When the principle of amalgamation was agreed to, it was not contemplated that the Companies could sell gas at less than 3s. 9d. per 1000 feet, and pay 10 per cent. dividend, and, therefore, the Board agreed to 3s. 9d. per 1000 with The Gaslight and Coke Company. But one Company in the Metropolis had not wasted their capital—viz., the South Metropolitan, whose stock bore a very different proportion to their revenue from that which appeared in the case of The Gaslight and Coke Company, who had hundreds of thousands of pounds of dead capital underneath the streets. It was contrary to every principle of equity and common sense to suppose that the Legislature had ever enacted that consumers should be compelled to pay 10 per cent. on this dead capital. Therefore the Board should press upon Parliament that the agreement entered into five or six years ago must not be considered as a permanent one binding for all time. The question now before them was whether 3s. 6d. per 1000 was at the present time a fair price. The fact was that the South Metropolitan Company did pay 11½ per cent., and lay by a small reserve-fund of £30,000 or £40,000, though they only charged 3s. per 1000 feet. The Phœnix were now supplying gas at 3s. 4d. per 1000 feet, and were under a contract to supply at 3s. at the end of twelve months; while, though by statute they were only compelled to give 12-candle gas, they prided themselves on the fact that they gave 15 or 16 candles. Therefore that very Company knew they could supply at 3s. per 1000, and they would not amalgamate with the South Metropolitan Company if they for a moment imagined that their dividends would be thereby decreased. It was not improbable that within another five or six years they would be able to obtain their 11½ per cent. with gas at 2s. 6d. per 1000 feet. Why, then, should the Board consent to the principle that 3s. 6d. should be the initial price for all time? He was surprised to hear Mr. Runtz speak as he had done, for the Board had nothing to do with the Gas Companies and their Shareholders, but only to take care of the interests of the consumers. Mr. Runtz's observations, however, had been in the interest of the Companies rather than that of the consumers. It was the duty of the Board to represent to the Government that they were not satisfied with a permanent initial price of 3s. 6d. No one wished to say anything against the South Metropolitan Company. They had obtained their Act and their 3s. 6d., and they would retain it until some statutory power interfered with it; but when they asked to be permitted to connect themselves with another large area of supply, the Board were bound to inform the Board of Trade that they considered the initial price of 3s. 6d. per 1000 feet ought to be reduced.

Mr. FREEMAN said he had no sympathy whatever with a number of the arguments which had been used by Mr. Runtz. The Board had nothing to do with one part of the south *versus* another part. What they had to consider was the interest of the whole of the consumers on the south side of the River Thames. He could not at all see why the Board should consent to the amendment, for that was just what the Gas Companies themselves would send to the Board of Trade. It was not necessary to say that the pensions, &c., should be arranged economically, and they need not make themselves advocates of the Gas Companies. With regard to the initial price, if after due consideration, and fully looking at the thing on all sides, they believed that 3s. 6d. per 1000 feet was too high, why should they not seek for a modification of the price? On the other hand, if they came to the decision that 3s. 6d. per 1000 was not too high, they ought not to interfere in the matter at all, for the Companies would have the assistance of the best counsel, and would take care of themselves. After one year, the amalgamated Companies would be compelled to supply gas at 3s. per 1000 feet. If the Company already proposed to supply gas at 3s. per 1000, why should the Board approve of 3s. 6d.? It seemed to him a monstrous anomaly to suggest such a thing. If they were not going to help the consumers to reduce the price, they had better keep away from the matter altogether; but if they had anything at all to do with it, they should certainly try to reduce the 3s. 6d. to 3s., at which price the Company themselves acknowledged they could afford to sell their gas.

Mr. COOK said that since the initial price was fixed, important modifications had taken place in the use of the residual products. Not long ago the Companies only received a farthing or a halfpenny per gallon for their tar; now they were getting threepence. So important had the manufacture of tar become, that The Gaslight and Coke Company had thought it worth while to make it a principal article, and not merely a bye-product of manufacture. At one time they were almost glad to get their ammoniacal liquor taken off their hands; but now there were at Beckton large ranges of stills and saturating-tanks for the purpose of making sulphate of ammonia. Was it to be laid down as a principle that because a few years ago 3s. 9d. and 3s. 6d. per 1000 feet were fair prices for gas, therefore all the benefit of the discoveries of science in the direction of the utilization of the residual products of gas manufacture should go to the Shareholders? Supposing the value of the tar were to double again, would not the consumers be entitled to derive some advantage from it? In ordinary cases when manufacturers obtained exorbitant profits, other factories were at once started, and so the profit was reduced to a fair trading rate; but the Gas Companies possessed a monopoly, and therefore they must submit to regulation by the State for the interests of the public. To adopt the doctrine laid down by Mr. Runtz, that an initial price had been fixed, would be to throw over the principle that the public had some control over the Companies in return for the monopoly granted. He thought the present was a very favourable time to go to the Board of Trade and say, "This question of the initial price must now be modified, and the consumers of gas as well as the Shareholders must receive some of the benefit which the modern discoveries of science have secured." He should therefore vote for the adoption of the report of the Committee.

Mr. JONES said he was informed that in the House of Commons there were two hundred and odd members who combined together to protect the gas and water interest. They made common cause against the public, and worked for their own private ends under the pretence of looking after the public welfare. He thought with some regret over the past *laches* of the Board. They ought to have objected to 10 per cent. being regarded as the proper amount of dividend to be obtained by these monopolies. Gas had become one of the necessaries of life, and while the Board could borrow money at 3½ per cent. secured upon the house property of the Metropolis, the Gas Companies received 10 per cent. upon practically the same security. That seemed to him to be an offence against the common intelligence of trading people. While there was competition it was a different matter, but when the Companies were secured against competitors, it became altogether a monstrous incubus upon the pockets of the ratepayers to allow 10 per cent., and he desired to save one district, at all events, from having such an incubus placed upon it. There must come a time when the whole system would be abolished, and the Board should at least endeavour to diminish the burden. The Gas Companies with their 10 per cent. twined themselves around London like the serpent around Laocoon. He also objected to this amalgamation, because the Act of Parliament allowed them to supply gas for heating purposes. He looked forward to the time when gas would be manufactured at the pit's mouth and sent through tubes along the country roads for the purpose of heating London, thus avoiding the necessity of sending colliers and railway trucks with the raw material to the Metropolis. No doubt there would be great difficulty in sending the hydrocarbons; but the hydrogen was the heating power, and that could be conveyed through pipes. The Phœnix Company had put into their Bill a clause to secure them the monopoly of the heating power of gas, so that in future no heating power company might come upon their territory. There would thus be an additional monopoly. This was a reason why he thought the Board should object to any further amalgamations. He liked the struggle of independent competition, and hated all these great corporations, which obstructed and oppressed. On the previous day he looked into the returns of the South Metropolitan Gas Company for the past twelve months as compared with the last three, and he found that twelve months ago they had double the quantity of ammonia, and 50 per cent. more sulphur, but when it became necessary to present themselves with clean faces before the Board of Trade, they mended their ways, purified their characters, and largely improved the quality of the article they supplied. So long as there was competition, there would be a constant necessity to keep down the price; but when competition was abolished, the public would be in the hands of the Companies, who would secure to themselves immense profits. He was therefore very glad to have had this opportunity of offering some resistance to further progress in the fatal direction of allowing 10 per cent. for a monopoly corporation.

Mr. SELWAY expressed his regret that the previous speakers had not confined themselves to the subject before the Board, instead of occupying a great deal of valuable time upon extraneous questions. His object in rising was to remind them of the clauses in the South Metropolitan Company's Act of Parliament, because the member for Lambeth seemed to have spoken in entire ignorance of the provisions of that Act. If the Board had contemplated approaching Parliament, in the ensuing session, upon the question of the initial price of gas in the Metropolis, that speech would have been pertinent; but it was altogether out of place at the present time, because the South Metropolitan Company's Act (39 & 40 Vict., cap. 229) contained these words: "The standard price to be charged by the Company for gas supplied by them shall be 3s. 6d. per 1000 cubic feet: Provided that the Company may increase or diminish such standard price subject to a decrease or increase in the standard rates of dividend as defined by this Act, to be calculated as follows:—For every penny or part of a penny charged in excess or in diminution of such standard price in any year, the standard rates of dividend shall for such year be reduced or increased by 5s. in £100 per annum." It was only three years since this initial price was settled, after a very long discussion and an extended inquiry by a Committee of the House of Commons. One honourable member who had spoken thought the initial price should be reviewed because of the discoveries of science; but if there had been such an increase in the value of the residual products of gas manufacture, the price of gas would be diminished, because the dividend would be increased as the selling price was diminished. Under the 64th section of the same Act, the Board of Trade had absolute power to allow this amalgamation if it thought fit, but it had no power to alter the initial price, so that the whole of the discussion that had taken place was beside the question. He took his stand upon the fact that the initial price was fixed in the Act, and therefore was not under the control of the Board of Trade. He thought that Mr. Runtz's amendment would answer every purpose, for all it asked was that if certain districts in South London had been supplied with gas at a cheaper rate than other districts, they should not be prejudiced by any action the Board of Trade might take. He apprehended that was all the Board wished to bring about, and therefore he trusted the amendment would be carried, because the resolution would stultify the Board, and place them in the awkward position of asking for that which they knew the Board of Trade had no power to grant.

Dr. BREWER said a large number of the constituents of the Board were men having a certain commodity which they approved of at 3s. per 1000 feet, and it was not for the Board to inquire whether the residual products of gas manufacture paid or did not pay. The position of the Board was that a Company which had given 15 or 16 candle gas at 3s. per 1000 feet had been able to pay their Shareholders 11½ per cent. dividend, though, of course, they knew that an altogether different state of things existed in the chemical world at present from what existed a few years ago.

Mr. COOK wished to know if it was not in 1868 that the initial price of 3s. 9d. per 1000 feet was agreed to on the north side of the Thames.

The SOLICITOR said that in 1868 the maximum price was fixed at 3s. 9d., but there was no sliding scale then. In connection with that scale the price was fixed at 3s. 9d. in 1875.

Mr. SELWAY asked at what date the initial price was fixed for the south of London.

The Solicitor said that was fixed, in connection with the sliding scale, in 1876.

Mr. Fowler asked what was meant by saying that the initial price was fixed for the south of London.

The Solicitor: For the South Metropolitan Gas Company.

Mr. Runtz's amendment was then put and lost—12 voting for it, and 26 against it.

Mr. Nathan moved another amendment—"That this Board recommends that the Board of Trade be informed that this Board objects to the proposed scheme, upon the ground that the United Company would have power to raise the present price of 3s. in the district now supplied by the South Metropolitan Gas Company, and that some provision ought to be inserted in the scheme to prevent any such increase of price if the amalgamation be granted."

The amendment found no seconder, and the resolution in favour of the recommendation of the Committee was then put and carried.

THE PROPOSED APPLICATION TO PARLIAMENT TO AMEND THE PENALTY CLAUSES OF THE CHARTERED, COMMERCIAL, AND SOUTH METROPOLITAN GAS ACTS.

The following report of the Parliamentary Committee was subsequently presented and adopted:—

Your Committee have to report that they have proceeded, on the resolution of the Board of the 5th inst., instructing them to confer with the Corporation, and to arrange the terms of a Bill, to be promoted jointly by the Corporation and the Board, to amend the provisions of certain gas Acts relative to the testing of gas, so as to enable the gas to be tested in the districts in which it is consumed. The Acts requiring amendment are The Gaslight and Coke Company Act, 1876, the Commercial Gas Act, 1875, and the South Metropolitan Gas Company's Act, 1876.

Your Committee met the Gas and Water Committee of the Corporation twice at the Guildhall, and agreed on the provisions of the Bill to be introduced, leaving it to the legal officers of the two bodies to settle the wording of the clauses.

A question has since arisen as to the relative positions of the Board and the Corporation in promoting the Bill, the consideration of which has led your Committee to the conclusion that it is undesirable for the Board to proceed further in conjunction with the Corporation in promoting the Bill next session.

The Board will, perhaps, remember that the necessity for some amendment of the law regulating the testing of gas was first pointed out by the Gas Referees, who are appointed by the Board of Trade, under the Acts of Parliament, to fix the positions of the testing-places, and to prescribe the mode of testing and other matters. They showed that it was difficult for them to put the testing-places in the districts in which the gas was consumed so long as the provisions which related to the recovery of forfeitures for defective gas remained as they now are. The Board, having been consulted by the Board of Trade on the subject on more than one occasion, suggested that the difficulty might be removed by a short Act of Parliament, which would probably be passed at the instance of the Board of Trade. In this opinion the Board of Trade was understood to concur; but as in neither of the years when the subject was under consideration had notice of any Bill been given, the Board of Trade would have been unable to introduce one into Parliament without asking for the suspension of the Standing Orders. Accordingly, in the last letter written to the Board on the subject, dated May 26, 1879, the Board of Trade suggested that the Board and the Corporation might confer as to the expediency of giving the necessary notices of a Bill in the coming autumn, and added that, if this course were adopted, the Board of Trade would be prepared to give all reasonable aid in furthering the object in view.

As there is a difficulty in proceeding in conjunction with the Corporation, and as it is desirable that the question should be settled, your Committee are of opinion that the Board of Trade should be asked, now that notice of a Bill has been given by the Corporation which will cover all that is required, to obtain the consent of the three Gas Companies concerned to the necessary amendment of their Acts of Parliament, so that the law in respect to the testing of gas, and the forfeitures to be incurred, may be uniform throughout their districts. If this be done, it appears to your Committee that there need be nothing to lead to any contest between the Board and the Gas Companies; but that, with the help of the Board of Trade, a short Bill confined to the necessary amendments may be passed with the consent of all parties.

Your Committee recommend that a letter to the above effect be addressed to the Board of Trade.

The following is Dr. Whitmore's report on the illuminating power, pressure, and quality of the gas supplied by The Gaslight and Coke Company in the parish of Marylebone during November:—

November.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogn.
	*Mean of 24 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Common gas . . .	16·56	17·70	15·71	25·00	10·00	13·23	0·23	No trace
Cannel gas	20·98	22·10	20·20	32·60	14·96	14·13	0·20	No trace

Mean of daily readings of barometer . . . 29·99
" " " thermometer . . . 54·97

* Each observation consists of ten readings of the photometer, at intervals of one minute.

The mean illuminating power of both gases consumed in the parish during the month of November was fully equal to their respective standards, once only the common gas fell below the standard to the extent of about a quarter of a candle. The mean amount of sulphur found in 100 cubic feet of the common gas was 13·23 grains, and in the cannel gas 14·13 grains. Practically there was no ammonia in either. The pressure of both gases was good, and on no occasion was sulphuretted hydrogen detected in either by the ordinary tests.

PHŒNIX GASLIGHT AND COKE COMPANY.

An Extraordinary General Meeting of this Company was held at the Bridge House Hotel, Southwark, on Wednesday last, to consider a scheme now pending before the Board of Trade for the amalgamation of the Company and the South Metropolitan Gas Company. Edward Horner, Esq., was in the chair.

The Secretary (Mr. I. A. Crookenden) read the notice convening the meeting, and subsequently the scheme for the amalgamation, a sketch of which has been given in the Journal.

The Chairman said: Gentlemen, the Secretary having read the scheme, it now devolves upon me to move—"That this meeting, having heard the scheme of amalgamation, hereby approves the same, and authorizes the Directors to take the necessary steps to carry it into effect, and further empowers them to initiate or agree to any variation in details which in their judgment they may deem expedient or necessary, with the sanction of the Board of Trade." In doing so, I may say that I do not suppose there is any proprietor of gas property here who is not perfectly well aware that much has been going on for several years past with regard to amalgamation between the Metropolitan Gas Companies. I think it will be quite unnecessary for me to refer to the many attempts which have been made for effecting an amalgamation between us and other Metropolitan Gas Companies, but I may mention that the most serious of those attempts took place at the commencement of this year, when The Gaslight and Coke Company made a proposal to amalgamate with all the Companies south of the Thames. Well, the London Company, being somewhat peculiarly situated, declined the offer altogether. The South Metropolitan Company, the Surrey Consumers Company, and ourselves, who entered into negotiations, agreed to the terms proposed, and I think I ought to mention, to show you the position which The Gaslight and Coke Company considered the South Metropolitan Company held, as being so much better than any other Company, that they then proposed £110 for every £100 of the South Metropolitan shares, thereby showing they were worth at least 10 per cent. more than those of any other Metropolitan Company. I mention that the more now because you perceive that the South Metropolitan Company are to have some advantage, in the shape of dividend on their A stock, over the others; and it would not be likely, as they were able to pay themselves a higher dividend, that they would amalgamate with other Companies in such a manner as to give them less dividend than they would have had if the amalgamation did not take place. You have heard the terms of the scheme read, and I think I need not trouble you with going through the provisions of the existing Acts of Parliament and the different clauses till I come down to the 16th clause, which relates to the Directors. The Directors of the Company are not to consist of more than twelve. The Surrey Consumers Company, who have already amalgamated with the South Metropolitan Company, had ten Directors. Of that number only one goes to the South Metropolitan, and it is proposed that five of the Phœnix Directors shall join that Board. There will be six of the South Metropolitan, one of the Surrey, and five of the Phœnix, making the twelve. That is to say, the B capital, which the Surrey Company consists of, and the B capital of which the Phœnix will consist, will be represented together by six members as against six members of the South Metropolitan Company. I should not say "against," for I do not suppose that, when the Boards are united, there will not be the utmost unanimity among them to do the best they can for all descriptions of capital—in fact, I do not see how one can benefit without the others. There are certain provisions as to retiring Auditors—the same thing as in all Acts—and there is also a clause which gives the Board power, under special circumstances, to grant some of their officers pensions, which would not exactly assimilate with the scale, and on that clause there are three or four officers who will come into the category, and be pensioned by the Board. The next serious part of the business is the capital. When this scheme was first submitted, if you look to the 4th clause in the note of explanation which we sent to you, you will see that it was there proposed that the 7½ per cent. and the 5 per cent. stocks should remain as they were, and should not be reduced until the other stocks were reduced below them—that is, to a certain extent giving them a *quasi* guarantee that their interest would be the same. Then, however, they would not participate in the extra dividend there might be under the sliding scale. When this scheme was submitted to the Board of Trade, the Board immediately said that this could not be—that it was contrary to the intention of Parliament that any part of the capital should be exempt from the operation of the sliding scale; and, therefore, we were obliged to take into consideration in what way we could alter the position of the capital so as to accord with the desire of the Board of Trade. The consequence is we have arranged that £360,000 of 7½ per cent. stock shall be converted into £270,000 of 10 per cent. stock. The amount of the dividend will be exactly the same to a shilling as it was before, but with this difference—that it will come under the sliding scale, and will get an increased dividend. In the first twelve months of the amalgamation, the price remaining at 3s. 4d. will entitle us to one-half per cent. more. In the first year after the amalgamation, that stock will receive 10½ per cent.—one-half per cent. more than now. The same remark applies to the 5 per cent. stock, which will also be converted into 10 per cent. stock. The dividend will be exactly as it was before, but being brought under the sliding scale, it will be entitled to one-half per cent. more after the first year of the amalgamation. Afterwards, when the price is reduced to 3s., those stocks will be entitled to 11½ per cent. It is greatly to the advantage of those two stocks, and it is also very advantageous that there should be only one capital. It is what we never contemplated, but we had no other course than to submit, and endeavour to do what the Board of Trade wished—that the whole of the capital should be brought under the sliding scale. Of course, the more stock there is under the sliding scale, the more interest we have in reducing the price of gas so as to give us as much dividend as we can earn on the stock. In carrying out this proposal, of course we must not forget that the public look very jealously on anything that is done which will give any gas proprietor a shilling more than he has hitherto received; no the contrary, the general wish is that he should not receive so much; but I think I may say that the public are going to be greatly benefited by this amalgamation. After twelve months we propose to reduce the price from 3s. 4d. to 3s., and this 4d. represents in our district alone £26,000 a year given to the consumers. When you look at that, the consumers ought to be very well satisfied at the union which is going to take place, seeing how largely and how soon they will benefit by it. In addition to this, under our present Act of Parliament we are not obliged to give more than 12-candle gas; but under the new *régime* we shall be obliged to give 16-candle, which will be virtually 17, as we are always obliged to be a little above, so as to be sure of having the proper quality. We also hope that there will be great economy in the working of the concern by the more concentrated management—fewer Directors, fewer Secretaries—and that by-and-by there will be a very sensible difference in the current expenses of the Company. We must not forget that there is considerable competition between the Companies as to the sale of coke. Coke is a residual product which affects the profits of a gas company to a very great extent. It is surprising to see the effect a shilling or two difference in the price of a ton of coke produces in the profits of a gas company. We hope that, by a management which will extend over such a large area as this, we shall be able to do away with much of the present competition, and perhaps improve the amount which we now receive from the source to which I have referred. All these are points in our favour which are open to us, and will, no doubt, help the concern very much indeed. I may mention, to show you that we have not lost sight of the interests of the Company, that the scheme which was sanctioned by the Board of Trade for the South Metropolitan and the Surrey Consumers Companies was that the Surrey Company should have a maximum dividend sharing up to 10½ per cent. We, I am happy to say, have made arrangements by which we shall share equally up to 11 per cent., being one-half per cent. more than by the scheme for the South Metropolitan and the Surrey Companies amalgamation. We must also remember that in carrying out this scheme we are going to ally ourselves to, as it would seem, the notoriously best-managed and most prosperous Company in the Metropolis—the Company who have been able to do more than any other—and that whatever net results there are over and above, which are considerable, will come to the assistance of the Phœnix stock, to ensure the dividends which it is proposed to pay. I think that, on the whole, seeing how very anxious the Board of Trade have been for a long time past that this amalgamation should be carried out, considering all circumstances, we have been exceedingly fortunate in being able to arrive at the conclusion we have; and seeing the great advantage this amalgamation will be to the Shareholders, inasmuch as by it they will get an immediate increase of one-half per cent. on their dividend, and in twelve months time may possibly have their dividend increased by 1½ per cent., I shall be somewhat surprised if they do not agree to it unanimously. I do hope, in order to strengthen our hands with the Board of Trade and the other Companies, that the Proprietors

will give us their entire support to-day. I can assure you with regard to myself, I may say especially, having been so long connected with the Company, it is rather a pang to break from that which I have been associated with for so many years. But duty is the first consideration, and we believe that we should not be doing our duty to the Proprietors if we had not brought this proposition before them as we have done.

The DEPUTY-CHAIRMAN (Mr. James Shand) said that after the very full explanation which had been given by the Chairman, he need not detain the meeting with any further remarks. He could endorse what the Chairman had said—that they themselves, as a Board, personally regretted the proposed change. They had worked very cordially and well together, and they had always had much pleasure in meeting the Shareholders; but duty, as the Chairman had said, was before pleasure. They had gone carefully into this matter; they had not acted hurriedly, for it had been before them for many years; and they had come to the conclusion that the arrangement proposed would be best for Shareholders and consumers generally.

Mr. CYRUS LEGG said it was not very often that he found fault with the Directors, but on this occasion he did not think they had done so well for the Shareholders as they really ought to have done. He must confess that he, for one, could not vote for the scheme of amalgamation as it was at present put before them. He did not know how the amalgamation might have come about, but it seemed to him that they were really making worse terms than the Surrey Consumers Company did. The capital of the Phœnix Company was £1,244,000, that of the South Metropolitan was £750,000, and that of the Surrey Company was £249,000; so that there was about a million and a quarter capital of the Phœnix to go against a million of the capital of the other two Companies. The rental of the Phœnix Company, according to the last published accounts, amounted to very nearly £148,000, while the rental of the other two Companies came to £138,000. They had paid for their coal during the same time £63,600, against £61,900 in the case of the other two Companies. The residuals of the Phœnix fetched £38,000, and those of the other two Companies £49,000. But then he would come to a very large item. The reserve of the Phœnix was £123,675, and that of the other two Companies was £46,598; so that the Phœnix reserve was more than 2½ times what the combined reserve of the other two Companies was; and the Phœnix Company were going to hand over the whole of that £123,600 to the South Metropolitan Company. Why, it would pay all the compensation they were going to give to the Directors and Officers, and anything of that nature, in a very handsome way. Then, the total expenditure of the Phœnix was £135,000, against, in the period to which he was alluding, about £120,000 in the case of the other two Companies. The cost of management of the Phœnix, with their large capital, was £6630, while that of the other two Companies was £7774; and yet they were going, with these figures before them, to be placed, as he conceived, in a very much worse position than the Surrey Consumers Company. The Chairman had told them, with respect to the Board of Trade, that they objected very much to any fixed guarantee of any particular shares. Well, there was no doubt that the 7½ and the 5 per cent. stocks of this Company were virtually guaranteed, although some question might have arisen on the point. Such question, however, never had been raised. In going under the sliding scale, the 7½ per cent. was to be converted into 10 per cent. stock, and the holders would then get an increased dividend; but they must bear in mind that this increased dividend would be less in proportion to what they would receive on the ordinary shares, and the same would be the case with the 5 per cent. stock. [Mr. Legg proceeded to make other remarks on the same point, but they were dissented from by Mr. Shand and other gentlemen. He also asked certain questions which are indicated in the replies of the Chairman.]

The CHAIRMAN: I mentioned that since the scheme had been submitted to the Board of Trade, the Board had suggested that all the capital should be so assimilated as to come under the sliding scale.

Mr. LEGG still contended that though the Directors might have done what they thought was the best, yet they had not done so well for the Company as they ought. Taking into consideration that the Phœnix was the largest Company concerned, that they had never solicited to go with the South Metropolitan, and that that Company made the application to the Phœnix, he thought some little better terms should have been made, and that they ought to have been put on the same terms as the South Metropolitan Company. They were quite independent of that Company, and were not, like the Surrey Consumers Company, hemmed in. That Company could not have carried on their business without a large outlay of capital which might have affected their dividend, and yet the Phœnix Company were going into the amalgamation on the same terms as the Surrey Consumers. He strongly contended that the Phœnix should be placed on an equality, as to terms, with the South Metropolitan, and said that that Company had shown that they looked very well after their own interests. When he saw that the capital, the rental—indeed, everything in connection with the Phœnix Company—was much larger than in the other two Companies together, and their reserve more than double that of the other Companies, he thought the Board might have strained a point, and tried to obtain little better terms for the Shareholders.

Mr. PARK said he held 5 per cent. stock, which according to the scheme proposed, was to drop to half the amount, and be represented by 10 per cent. stock. He considered this was a great disadvantage. The 5 per cent. stock was more likely to get a rise than the 10 per cent.

Mr. SHAND said it could not go beyond the 5 per cent.—the holders could not receive more than that rate.

Mr. PARK said he thought the 5 per cent. stock was a much more saleable and a better stock.

Mr. SHAND dissented, and pointed out that it represented only £144,000 out of their capital of 1¼ millions.

Mr. PARK said he thought it was altogether hard on the Proprietors to have their stock altered and thrown into a very large concern, when they had such a compact business. He thought the Company were in a most excellent position, and yet they were going to amalgamate with two other concerns of which he knew nothing. He would much rather remain as they were.

Mr. SHAND: So we all would.

The CHAIRMAN: I was sorry to hear our friend Mr. Legg say he thought we had not done so well as we ought to have done, and he has drawn some comparison as to the amount of our capital and that of the South Metropolitan and the Surrey Consumers Companies, and also with regard to the rental. As to the rental, if you reduce our price to the same as that charged by the South Metropolitan Company, it would take a large sum off, and bring down the £148,000 to something like £130,000 or £132,000. As to the capital, it may be thought that because ours was larger than the other Companies, we should have been in a more prominent position; but you must recollect that we have no parliamentary powers ourselves to amalgamate with any other Company. The South Metropolitan Company, under their Act of 1876, have power to amalgamate with this Company. Therefore, the business could only be initiated by them. We had no power to do anything of the kind unless we brought a Bill into Parliament for the purpose. We are now able to do it by the more easy mode of agreeing to a scheme, and getting it sanctioned by the Board of Trade, without going to Parliament at all. As to the reserves, that of the South Metropolitan Company, previous to the passing of their last Act, was 10 per cent. on their capital—about the same as ours—and they had a very large undivided balance besides. There is also, with regard to these capitals, another phase which I did not refer to, but to which Mr. Legg has drawn attention, and it is not a good feature for the Phœnix Company. If you compare our capital per ton of coal carbonized with those of the South Metropolitan and Surrey Companies, you will find that ours is £6 per ton, while that of the South Metropolitan Company is under £5, and that of the Surrey Company about the same. You must not look at the capital, but at what is done with the money, inasmuch as they with £5 are able to carbonize a ton of coal, whereas, unfortunately for us, being the older works, our original works cost us a large sum, and our capital stands higher than theirs. I do not think, therefore, that it redounds to our position that we are able to boast of a larger capital. As a tradesman selling gas, I wish it were less. Then our friend seems to have confused himself a little as to the sliding scale and the amount of the dividend. The 5 per cent. stock is going to be converted into 10 per cent. stock, and he told us that if the dividend were reduced to 9½ per cent. it would be a reduction of 1 per cent. from the 5 per cent., supposing that it had remained 5 per cent. According to my calculation, it would be only a quarter per cent.; so that the dividend, instead of being only 4 per cent., would be 4¼. Then as to the comparison of these stocks. I think every one conversant with City affairs knows perfectly well that the larger the amount of any particular stock, the more saleable it is. I have consulted many people in the market, and I am told, "If your stocks are converted into one uniform 10 per cent. stock, it will tend to make it more saleable than it is now." That £140,000 of the 5 per cent. stock is a very small amount; there are no dealers, and if you wish to sell, it is a matter for negotiation. I believe by converting these stocks into one stock you will certainly get the same income, you may have an increased dividend, and will find that your property will be in a much better marketable condition. I am reminded that the railway companies are pursuing the same system in adjusting their stocks in such a way that they shall be under one denomination; and I cannot forget what was told me by a very prominent man recently. He said: "Never buy into a small, but always into a large stock."

The motion was then put, and, on the show of hands being taken,

The CHAIRMAN said: There are four dissentients, so the motion is carried by a very large majority.

A further extraordinary general meeting was then held, "to consider a Bill submitted to Parliament, enabling the Company to acquire more land and create further capital, and for other purposes."

The SECRETARY having read the notice convening the meeting,

The CHAIRMAN said: Previous to the South Metropolitan Company making us this proposition for amalgamation, we were completing the last retort-house at Vauxhall, and we began to think, in face of the extraordinary increase in the consumption of gas, that it was necessary to look about for means to increase the supply. Consequent on this, we entered into negotiations for a piece of land in Greenwich parish, in our own district, consisting of 86 acres, with a water frontage to the River Thames, and bounded on one side by the South-Eastern Railway, giving us communication all over the kingdom for our products. If we were driven by force of circumstances, we could get our coals by railway as well as by river. We could not wait for this arrangement, and it therefore became necessary that we should give notice of a Bill for powers to buy this land, and to raise further capital. If the amalgamation is carried out, we shall be defunct as the Phœnix Company, and shall not be able to proceed with the Bill ourselves; but we thought it would not be prudent to abandon the position we were in, and therefore we have given the requisite notices to every one concerned, so that if the amalgamation should fall through, we shall be able to go on with the Bill next session. We have further made this provision—that in the event of the amalgamation being carried out, then the amalgamated Company will take up the Bill, and will have to acquire land and further capital in order to get it, as this land will be of equal importance to the amalgamated Company as it would be to us. In fact, it is an opportunity which I should think has rarely happened to any one, to be able to acquire such a large area of land with only one proprietor to deal with, and no interests to buy out. It also has this advantage, that it will enable us to do what they have done at Beckton—carry our works lower down the river. I shall therefore ask you to sanction this resolution, which is only to be carried to put us in a proper position should the amalgamation fail. We do not in the least imagine that it will, but still it would not be prudent for us not to take this step, of asking you to give us authority to proceed with the Bill for the acquisition of land and the raising of further capital. I therefore move—"That this meeting approves the Bill now submitted, and authorizes the Board to lodge and prosecute the same in Parliament." The Bill has been deposited; this is the last day for doing so, and if the amalgamation takes place, we shall abandon it; and then, if necessary, it will be taken up by the amalgamated Company.

Mr. SHAND seconded the motion, and in doing so said the measure was rendered necessary by the extension of the Company's business. They had reached the extremity both of their land and capital.

The CHAIRMAN: Since we obtained our last Act in 1864, the quantity of coal carbonized has very greatly increased. In the corresponding week of that year the quantity carbonized was 2708 tons, while this week we have carbonized 5700 tons—being more than double. The increase of consumption—from 6 to 8 per cent.—is proceeding at such a rate that it will necessitate a very large extension of the works, and every one knows that gas-works take at least two years to erect.

The motion was then put, and carried unanimously.

The CHAIRMAN: That is all the business we have invited you here for, and, on the part of the Directors, I have to thank you for the support you have given us on this occasion. I can assure you that whatever difference of opinion there may have been, we do our best, and I am sure you will give us credit, ourselves being large Shareholders, for doing that which we thought for the greatest benefit of the Company. I may also mention, now that the whole thing is over, that we have received in favour of it the proxies of a very large portion of the entire capital of the concern.

Mr. BENJAMIN then moved, and Mr. MORTER seconded, a vote of thanks to the Chairman, but at the suggestion of Mr. LEGG, the Directors were included in the resolution, which was carried unanimously.

The CHAIRMAN, in reply, said: Gentlemen, we are exceedingly obliged to you for having paid this compliment to us, and we can only thank you for it. Of course, you will all remember that this is really not our last meeting, because we shall hold our dividend meeting as usual after Christmas.

The proceedings then terminated.

MR. ALEXANDER ELLIS, late Secretary of the Honourable Artillery Company, has been appointed Secretary of the Commercial Gas Company, in succession to Mr. E. J. Southwell, who died on the 17th of September last.

CONTINENTAL UNION GAS COMPANY, LIMITED.

The Annual General Meeting of this Company was held at the London Offices on Tuesday last—HENRY M'LAUCHLAN BACKLER, Esq., in the chair.

The SECRETARY (Mr. H. John) read the notice convening the meeting, and the following report of the Directors:—

The improvements and extensions carried out in the various stations of the *Union des Gaz* during the past working year will be found detailed in the printed report of that Company now lying on the table. These works, amounting to £18,300, consist principally of new mains laid and public lamps erected under the respective concessions, the amount spent on additional apparatus being comparatively small. A further sum of £6230 was expended in the purchase of land at Genoa, Vienne, and Albi, for the present and future development of those stations.

In the course of the year under consideration the concessions about to terminate for lighting the towns of Vienne and Roanne, were renewed for long terms—the first until 1911, and the other till 1918; but the conditions of renewal were not so favourable as the Board desired and endeavoured to obtain. The consequent reduction in the net profits at these stations has had a prejudicial effect on the general results of an otherwise prosperous year; but the increased sale of gas expected to arise from lower prices will probably soon afford adequate compensation for this temporary depression. The improvement has indeed already manifested itself in a very marked manner at Roanne, and the same is anticipated at Vienne after the termination of a strike of the cloth weavers, which has been the cause of the loss to the Company, for a time, of the most important consumers in that town.

In all other respects the business of the Company has been both growing and satisfactory, and the aggregate amount of profits realized by the *Union des Gaz* is, notwithstanding what has been referred to, nearly equal to that of the previous year. The steadily progressing demand for gas in the towns lighted by the Company, the care and economy with which the manufacture has been conducted, and the reduced prices under favourable contracts both for coals and freights, are amongst the causes of this gratifying result.

At the stations of the Continental Union Gas Company an outlay of £3520 has been incurred on new works, including a dwelling-house for the Manager and a new gasholder at Montargis; also a new boiler and pumps at Messina; and various extensions and alterations in the mains of both towns. The returns of these two works show a most satisfactory improvement, which the Board expect to see continued throughout the current year.

It will be observed by the accounts now produced that the total profit has increased from £54,729 6s. 6d. in the previous year, to £57,163 18s. 3d.; but as this amount will have to be distributed over a larger capital, owing to the call of £1 10s. made in February, 1878, on the new shares, the dividend the Directors propose to declare will be, as before, at the rate of 6½ per cent. per annum, leaving a sum of £7429 19s. to be carried forward to next year, instead of £4832 brought forward from the last account. An interim dividend at the rate of 2½ per cent. having been paid on the 4th of July, the Directors now propose a final one of 4 per cent.

In order to reduce the large amount of debentures outstanding at high rates of interest, the Directors availed themselves of an improvement in the market price of the preference shares, to issue, at a premium, the balance not taken up by the Proprietors, to whom they were offered at par when originally created. The net amount of the premium thus realized, after payment of charges and expenses, has been placed to the credit of the general sinking-fund, and the debenture debt will shortly be reduced to about one-half the sum at which it stood this time last year.

The retiring Director is William White, Esq., who, being eligible for re-election, offers himself accordingly.

The retiring Auditors are Alfred Hersee and Frederic Tendron, Esqs., who, being eligible for re-election, also offer themselves accordingly.

The CHAIRMAN: Gentlemen, you will have observed by the report and statement of accounts just read that the last financial year, although one of general depression in business throughout the world—a depression severely felt in Italy and Germany, where the principal stations from which this Company derives its revenue are situated—has not proved altogether unfavourable to our interests. Not to trouble you with many details which might perhaps be difficult to understand at first hearing, I will merely mention the result of a few calculations showing with some clearness the real state of affairs. The increase in the number of private lights obtained during the year is at the rate of 5 per cent. In the quantity of coal carbonized the increase is at the rate of 3 per cent.; but the quantity of gas sold shows an increase of 3½ per cent. The rental received has, however, only increased by 1½ per cent. Now, with these figures before me, it is satisfactory to be able to add that the profits have increased at the rate of 4½ per cent., which, as you are already aware from the reading of the report, enables us not only to maintain the same rate of dividend as last year on a larger capital, after making ample provision for all contingencies, but also to add considerably to the amount of undivided balance. Now the figures I have just laid before you admit of the following inferences:—That, the proportion which the gas sold bears to the quantity of coals carbonized being somewhat higher, the working must have been better, and, in fact, this is represented by a reduction in leakage. The additional number of lights taken on being at the rate of 5 per cent., whereas the excess of gas consumed is only 3½ per cent., shows that all the lights, in the aggregate, have not been so productive as during the previous year. But there they all are, still fitted up, and ready to consume more gas whenever a revival of prosperity renders measures of economy less necessary on the part of the consumers. The reason why the percentage of increase of rental is only 1½, which is less than the other percentages I have just referred to, is that the reduction of prices mentioned in the report—and which, of course, we could not avoid—has affected the receipts to this extent, and owing also in some degree to the fact that we have been disappointed in not obtaining such good returns as we expected from two important stations—Strasburg and Nîmes. We are, however, doing all in our power to stimulate an improvement, and such an improvement, if we may judge by returns recently received—and which we have been examining this morning—is already at hand. Before I leave the subject of the year's working, I should say that the coals laid into store cost us 9d. per ton less, but we had to submit to a further reduction of 1s. 8d. per ton in the price of coke, in order to overcome the competition of other cheap fuel. We have, however, succeeded in effecting a rise, which we hope we shall be able to maintain. Other products are about the same as last year—there is very little difference in the yield of the two. I may say, with regard to the reductions of price at Vienne and Roanne, that although we have been obliged to reduce the price at these two stations, yet we may congratulate ourselves on having thereby obtained exclusive privileges for many years forward; and I may in addition say, while on this subject, that it has become most difficult to renew gas concessions abroad, owing to the keen competition of a class of speculators and adventurers, more or less unscrupulous, who care little for the ultimate loss they may bring on others, provided they manage to feather their own nests. Although some skill is required to steer clear of such breakers, I am pleased to be able to say that our own straightforward dealings with the authorities are duly appreciated, and I think I may add with certainty that we may always depend at the very least on obtaining a preference over others, on equal terms. Now, if during the past year we had depended on the *Union des Gaz* stations only, or on the amount we derive from the dividend on our shares in that Company, we should now be exactly where we were last year, and could only have carried over the same sum to the following year; but I am very happy to inform you that the stations which are the direct property of the Continental Union Gas Company have improved in a much greater ratio than those in the *Union des Gaz*, and it is from this source that we derive the additional income which is at present at our disposal. I have now to refer to the subject of the sale of the shares we made during the year. The object of the Board, as you are aware, was to reduce the very heavy liability of the Company in the shape of the large debenture debt, the repayment of portions of which might have been required at very inconvenient times. In order to effect this object, the Board had two courses open to them. The one was to sell an equivalent number of shares in the *Union des Gaz*, and the other was to dispose of the remaining preference shares in the Continental Union Gas Company which were not taken up by the Proprietors when offered to them at par some years ago. After mature consideration, the Board preferred the latter mode of action, principally because it would have been much more difficult to dispose of any considerable number of *Union des Gaz* shares. Moreover, I believe that our investment in the *Union des Gaz*, high as it now stands, will improve so materially in the course of a few years, that we shall feel very loth to part with any portion of it. The operation was entirely successful, and has enabled us to effect the threefold object of paying off the expiring debentures as they fell due, unless we could renew them at a low rate of interest; of permitting a considerable addition to the sinking-fund, out of the premiums realized; and of leaving a sufficient balance to enable us to pay off any remaining debentures which may become due, and which we may not desire to renew. I have no further remarks to make now on this subject, but I shall be very glad to hear any question or observation come from the body of the meeting, either on these or any other points, and in order to afford an opportunity for this, I will move—"That the report of the Directors and the statement of accounts now read be received and adopted."

Mr. W. WHITE seconded the motion.

Mr. F. E. SMITH (of Sheffield) said he was very much pleased in many respects with the report presented that day, but he was prepared to expect some increase in the profits. Trade had not been so bad on the continent of Europe as in this country, and some years ago he remembered that they divided 8 per cent. That dividend was reduced in consequence of the large increase in the price of coal, and the rate of exchange was also very much against them. However, they were now buying coals at the minimum price, and the rate of exchange, he supposed, had considerably improved of late in favour of the Company. Other Companies of a similar character—for instance, the Imperial Continental Gas Association and the European Gas Company—had been increasing their dividends recently, and he believed others now paid dividends as large as, if not larger than they ever paid previously, and therefore he could not see how it was that they did not get a larger amount of profit in this concern. He was perfectly satisfied that with the profit made it would not be prudent to divide more than 6½ per cent., as he always believed in carrying forward a balance; but at the same time he could not see why they did not realize larger profits, or what was the cause, after earning and paying a dividend of 8 per cent. some years ago, with the growth of the Company and with the large extensions of their mains and their supply of gas, that larger profits should not have been made. The call of 30s. per share that was made in February last year had taken some portion of the profits, but he had yet to learn that money employed in foreign countries did not earn some profit, and though the Company had called up capital, this had no doubt been done to extinguish other things for which they would receive good interest. The Chairman had not referred to the electric light, and he was glad to think it had become such a nonentity as not to require a reference being made to it. Some of them said it would only be a nine days wonder, and those Shareholders who parted with their shares in the Company now saw the folly of having done so. He was glad to think that the Chairman did not now entertain any fear on the subject. He looked forward confidently to the future of the Company, but he had been wondering whether they had, as Managers abroad, men who displayed the same ability as the Directors did at home. Possibly they had Managers abroad who did not avail themselves of every opportunity in their power of getting the business they might. In his own town he knew that gas was made actually for nothing, because the sale of the residuals was so productive that it paid the actual cost of the make of the gas—he was speaking of Sheffield. He had been wondering whether this Company obtained a proper price for their coke. He knew that in some towns in England the gas companies received nothing for their coke, as compared with what was obtained for it in Sheffield, where they had men who were very wide awake.

A SHAREHOLDER: What is the price of coal at Sheffield?

Mr. SMITH said it varied according to the quality. Household coal was about 12s. at the pit. He thought this was a matter that should be looked after. He repeated that he was very much pleased with the report as a whole, still he had expected to find the Company steadily progressing.

Mr. F. TENDRON would not enter into the details referred to by the last speaker, which were very interesting, and to which he had listened with great interest. He, however, asked the Shareholders to contrast the position of the Company now with what it was some years ago, when it paid larger dividends. The bulk of the Company's income was from the *Union des Gaz*, which was managed on the French principle of extinguishing its obligations out of revenue. For this purpose they paid £27,000 a year, and he believed he was not mistaken in saying that on Jan. 1, 1883, the whole of this sum, which was originally £300,000, would be extinguished. He did not suppose there was such another Company, paying a similar charge of £27,000 a year, which in a few years would entirely cease.

Mr. ALFRED PENNY said that, although he had been a Shareholder in the Company for many years, he had not been in the habit of attending the meetings, but he must confess that he felt a kind of sympathy with the remarks of Mr. Smith in relation to the dividend. As an expert himself, and an adviser of many gas companies, he was conversant with the mode in which the affairs of those companies were conducted, and although it might be said that trade was bad, yet in England the gas companies had continued to make their full dividends, and in many cases also to reduce the price of gas. The explanation given by the previous speaker as to the disposal of profits must be taken into account, and be considered satisfactory. He meant that instead of the Directors bringing before the Shareholders the whole of the profits and dividing them, a portion of the profit was used in extinguishing their obligations; and if they were gradually extinguished by these means, the present race of Shareholders must suffer somewhat for the benefit of those who came after. Whether that was the right thing or not was a question of policy, and this he was quite content to leave in the hands of the Directors. As regarded the general business of the Company, and the manner in which it was carried on, he thought it required no remark, as it was quite satisfactory. But there was one point that he wished, with great submission, to press upon the Directors, although he knew it had been dealt with at some previous meetings—viz., the advisability of issuing, with the notice of meeting, some short abstract of the yearly accounts, giving such general details of the progress of the Company as would enable the Shareholders to discuss its contents, instead of having to acquire this knowledge by listening to the statements or report made by the Chairman at the meeting. At the same time he quite appreciated what had been said on the Directors side of the table, on a former occasion, as to the inadvisability of giving information which might be taken advantage of by their opponents, and used as a weapon to the injury of the Company; and he only asked that the report should be of such a general nature as would prevent the possibility of such a result.

Let them have under the head of "Capital" the amount of shares paid up, and money borrowed, and the amount of money expended on works out of capital account, with any additions since the last annual statement. Let them add to this the number of tons of coals carbonized, the quantity of gas made and sold, and the loss by leakage. The publication of this information would also act beneficially on the various Managers. They knew that once a year the Shareholders met the Directors face to face, and if these points were put prominently forward, they would be kept up to the mark, and so prevent the Shareholders from finding one year's working more than the other. He believed the Chairman had admitted that the Board had reason to complain that the working results at some of the stations were not all that they had expected, and he, therefore, thought it would be well if the Managers were made aware that their respective workings were liable to be criticized by the Shareholders. Instead, therefore, of merely calling the Shareholders together and letting them hear from the mouth of the Chairman what the position of the Company was, they might issue, in the form they themselves chose, such a statement as would give the Shareholders some idea of the position of their undertaking. As to the interests of the Company, he supposed that they were all actuated by only one feeling—a desire to see it prosper. He was sure the Board had very arduous duties to perform with Managers abroad, whom it was very difficult always to control. What the Shareholders had to deal with, however, was the general result of the whole working of the undertaking. If good, so much the better; if bad, they could not help it; but at the same time he did think a dividend of 6½ per cent. in a foreign gas undertaking was not all that they might hope for and expect.

Mr. Baddeley pointed out, with regard to the suggestion of the last speaker, that the London Companies were in a very different position from that in which this Company stood. The London Companies and their customers were, in a measure, partners; they had a Government Auditor, and their accounts had to be furnished to the Board of Trade, that they might sit in judgment on the Companies. Such, however, was not the position of the Continental Union Gas Company. There was another Company he would refer to—the Imperial Continental Gas Association—whose meetings he attended, and there he did not get so much information as was afforded him here. He received a good dividend there, and he was quite sure that if the Imperial Continental Gas Association did what the previous speaker had suggested, they would no more obtain any increase in their dividend than the electric light, in its present condition, would be a success. There was a colonial gas company which issued a report and accounts, but they only did so because it had been their practice from the incorporation of the company; and if he were asked his opinion, he thought it was very much to be regretted that the company had done so, as he believed it militated against the proper conduct of the business, and raised questions on the renewal of contracts. As to the exchange, they might consider themselves very fortunate. He had audited the accounts of a company which in the last twelve months lost £58,000. The exchanges had not been in their favour recently, nor had the progress of trade, because when it was remembered that the accounts they were now considering were made up to the 30th of June last, no one, he thought, would advance the idea that trade had increased in prosperity up to that date. Since then there had been an improvement in chemicals, and he had no doubt that this Company would participate reasonably in the effects of that improvement. With regard to realizing sufficient from the sale of their products to pay for the cost of the make of the gas, he really believed that no company had arrived at such a position, because the price they obtained from their products must always depend on the law of supply and demand; and with regard to coal, it was no doubt purchased at the most favourable prices the Directors could obtain.

The Chairman: I will now reply to the various remarks that have been made. And first of all I must express my sense of the kind feeling and the complimentary way in which all the Shareholders who have spoken have addressed the meeting; but I feel for myself and colleagues that you have only done us justice in attributing to us a strong desire to do the best we possibly can for the Company. The first point was that raised by Mr. Smith, that trade had not been so bad on the Continent as in other parts of the world—England and elsewhere. Now, the Continent is a large place, and includes many kingdoms, and republics, and various localities. Mr. Smith was quite right in what he said with regard to France, if his remark really applied to France; but you must remember that our principal stations are situated in Italy, and one of our largest is in Alsace-Lorraine, which we are now obliged to call Germany. I think I stated in my opening remarks that I believed those two countries had felt very severe depression of trade, and it is because the depression had been more severe in those countries than in most others that I was induced to make that remark. If by good fortune we had all our stations in France, and had, like the European Gas Company, some of the best towns in that country to light, or were like the Imperial Continental Gas Association, with such a magnificent city as Vienna to light, then, I think, we should have done as well as either of those Companies. The price of coal, I believe, is at its minimum; but the price of coal is not the only thing to be regarded. There is the rate of freight, and that bears a much larger proportion in some countries than others to the total cost of coal, and we have not had the same reduction in the rate of freight as we have had in the price of coal. The price of coal, which I recollect at one time—about six or seven years ago—was nearly four times what it is now, bears no relation to freight, which has been reduced something like 30 or 40 per cent. The rate of exchange, instead of being less, as Mr. Smith supposes, has really been more against us, and we are charged with about £400 more than during the previous year. The income-tax is also another item not referred to, but which I may as well mention, as it is a very considerable charge, owing to the difference between 3d. and 5d., the Shareholders receiving their dividends free of income-tax. From the accounts read to you it will be seen that we could have paid 7 per cent. if we had thought it prudent; but to do so we should have had to trench to the extent of £1000 on the balance we brought forward, and we do not think, seeing the present state of Italy and other countries where our works are situated, that we ought to do this till we see a little clearer into the next few years than we are able to do at present. I think there has been some slight misapprehension as to the remark I made respecting Strasburg and Nimes. What I said with regard to those stations was not to impute blame to the Managers, but to show that we ourselves thought those stations would do better than they have done. I believe that the Managers have done the best that they could, and we stimulate them, as we do all the others, not only by constant correspondence, but by personal visits when we can spare the time; and within the last twelve months most of the stations of the Company have been visited by two of the Directors. Unfortunately, our time does not allow us to stay so long as we could, in the interests of the Company, wish. One reason why we have not such large profits as some other companies is that we have had to reduce the price of gas very materially from time to time. You see from the report that we have done it in several cases during the past year, but the diminution of price will have the desired effect, when we come into the full benefit of improved trade, in giving us a large increase in the consumption of gas; for the new burners, as I explained in addressing you just now, are already fitted, and are only kept back because the tradespeople and the owners of factories positively cannot afford to burn the gas. When they resume their lighting they will be able to do so at the lower price we charge, and we shall receive the full benefit of it. I also stated that I expected in the course of a few years our investment in the *Union des Gaz* would improve very materially. I had in my mind, when I mentioned this, the subject which Mr. Tendron has brought before you. In the course of a few years—in about three from now—the *Union des Gaz* will have paid off the whole of their obligations, and be in a position to pay a much larger dividend. According to French law and custom, they are obliged to pay off these bonds and the interest, both of which will cease at that time. With regard to the servants we have in the Company, of course in every undertaking there are good and bad. I do not say that ours are the very best you could obtain in Europe; but many of them are very able men indeed, in whom we have full confidence, and we should find it difficult, perhaps, on the whole, to have a better staff than we possess. Where there is any stimulus wanted, we do not hesitate to apply it in the strongest terms. Fortunately for us, it is not very often that we are obliged to have recourse to such a mode of dealing with them. I need scarcely answer what has been said with respect to the residuals, because we get the best price we can for our coke. We do not sell it under market value. We have at our large stations men specially acquainted with that business; and to give you some idea of the competition we have to encounter, I may inform you that at this moment, at Milan, we have a large quantity of coke sent from Lyons to compete with us, and very serious competition it is; and three or four months ago, before symptoms of a revival of trade appeared, and before the frost set in, we were threatened with very large quantities of coke to be sent from Beckton to Genoa to compete with us. This probably would have been sold at such a price that it would have seriously damaged us; but, fortunately, the revival of trade and the appearance of frost prevented such action from being carried out. Now that we are relieved from this, we are able to increase the price to some extent, and I have every reason to suppose we shall be able to maintain it. We sell all our tar, but very little liquor, as we work it up so as to get the best price we can for it; and do not suppose that if we can sell anything for 2½d. we sell it for 2d. You have seen from what I have stated that if we are going through rather trying times at present, we are in hopes that in the course of a few years good times will come. In fact, I believe they are now coming, and those who have the courage to wait will, I am sure, hereafter congratulate themselves on having done so, and I hope will then acknowledge that we have done the best we could to bring on those good times as rapidly as possible. With regard to the remarks of the gentleman who referred to the issue of a report, it would, I think—as we have stated before, and as the Shareholders themselves have acknowledged—be damaging to us if we were to publish any particulars of our working, and especially any particulars referring to our stations. If we published general particulars, embracing all the stations, as suggested, it would not be of any value whatever. Now that we are not in very prosperous times, the damage might not perhaps be so considerable; but if we reach those times, which I believe we shall enter on in the course of a reasonable interval, then I say it would be extremely damaging to do what this gentleman proposes. We have done for you the utmost that we thought was prudent. We publish a report of the proceedings at each meeting, and every Shareholder receives a copy of it. If we were to engage to do more than this we should have to be very reticent indeed in our statements. We could not give you any information which would afford you any real knowledge of the concern, as it would have to be in such general terms as to preclude that. I think I have replied to nearly every point.

A Shareholder: As to the electric light?

The Chairman: I thought I might, perhaps, be spared saying anything about the electric light this time, for I have spoken very often on the subject, and all I have said and written holds as good to-day as hitherto. Last night I was at the Aldersgate Street station, and while there I tried to read a newspaper by the light; but I found by the constant fluctuations it was so very inconvenient that I should not like to be obliged to use the light as a penalty.

A Shareholder asked if the Chairman had seen the article on electric lighting in *The Times* of that morning, in which reference was made to a further extension of the system to the Victoria station of the Metropolitan District Railway.

The Chairman replied in the affirmative, and in continuation said: A short time ago I saw a report of the light at the British Museum, and one gentleman remarked that it was so good that his eyes were very much better after reading by it than they were before. I think those are all the points which were raised; but if I have omitted any, I shall be happy to reply to them.

The motion was then put, and carried unanimously.

On the motion of the Chairman, seconded by Mr. H. W. Blake, the retiring Director, Mr. W. White, was unanimously re-elected.

Mr. White having briefly returned thanks,

Messrs. A. Hersee and F. Tendron were severally re-elected Auditors of the Company, and Mr. Hersee returned thanks on behalf of himself and his colleague.

Mr. Smith then proposed a vote of thanks to the Chairman and Directors.

Mr. Penny seconded the motion, and, in doing so, expressed his regret that the Board had not thought it their duty to consider favourably what he had said. He could not help thinking that, in making the suggestion he had placed before them, he had shown no less respect for the interests of the Company than the Chairman from the point of view of the Board.

Mr. E. Vaughan Richards, Q.C., said the matter had been brought before the Court, and the Court had decided against Mr. Penny.

The motion was carried unanimously.

The Chairman: On the part of myself and my colleagues, I beg to thank you for the resolution you have passed. I need hardly repeat that we do the very best we can for the Company. Our interest is your interest, and we leave no stone unturned to achieve the best results.

The proceedings then terminated.

Mr. John Pattinson, F.I.C., Gas Examiner to the Corporation of Newcastle-upon-Tyne, has been appointed on the Committee of the British Association charged with making inquiry as to the best means for the development of light from coal gas of different qualities, in place of the late Mr. Thomas Wills.

The Corporation of Hull and the Electric Light.—On Monday, the 15th inst., a public meeting of owners and ratepayers was held in Hull, to consider the advisability of the Corporation applying to Parliament for a Bill authorizing the lighting of the borough by means of electricity. The Mayor (Dr. King) who occupied the chair, explained that the meeting was held to confirm a resolution come to by the Town Council to promote a Bill in the next session of Parliament to enable them to light the streets by electricity. He moved the formal resolution empowering the expenses to be charged on the borough fund. Mr. Elam seconded the motion, which was carried with five dissentients.

CHELSEA WATER-WORKS COMPANY.

The Half-Yearly General Meeting of this Company was held at the Offices, Commercial Road, Pimlico, on Thursday last—JOHN DEEDES, Esq. (the Governor), in the chair.

The SECRETARY (Mr. A. Gill) having read the notice convening the meeting, and also the reports of the Government Auditor and the Auditors of the Company, the following report and statement of accounts were presented :—

The audited accounts of the Company for the half year up to Sept. 30, 1879, are presented to the Proprietors herewith.

The revenue from water-rents and other sources amounted in the half year to £50,384 9s. 1d., showing an increase of £714 11s. 8d. as compared with the corresponding period of last year; and the expenses of maintenance and management to £16,810 2s. 1d., being a decrease of £1023 5s. 11d. as compared with the corresponding period of last year. The dividend and interest account includes an item of £900, being the first half-yearly charge on the £40,000 debenture stock raised in May, 1878.

The capital account shows a further expenditure of £4563 1s. 10d. It includes the cost of 2400 yards of mains and service-pipes laid during the half year for ordinary extensions, and (with the exception of a small balance due on the contract) the remainder of the cost of the auxiliary district main previously reported on. This main completely answers the purpose for which it was designed, as it is not only capable of conveying a larger quantity of water into the district, but serves to increase the pressure where most required.

The Directors have the satisfaction to report that the open spaces within the Company's limits of supply are being steadily built over, and that the income is thereby gradually improving. New buildings are all served under the constant supply system, and the Company are prepared to extend that system in the older parts of the district when called upon to do so. Twenty-two houses and stables have been pulled down during the half year, and 215 new supplies connected with the works, representing future water-rental estimated at £1200 per annum.

The quantity of water pumped up to the service reservoirs on Putney Heath in the half year was 1580 million gallons, being nearly 23 millions in excess of the quantity pumped in the half year to Michaelmas, 1878, and at a cost somewhat less.

The Engineer reports that the steam-engines and pumps are in good working order, and when some slight repairs now in hand have been completed, they will be as sound and serviceable as when first taken into use. With this exception, the Company's property of all descriptions is in a state of thorough repair and efficiency. The reservoirs at Molesey continue to fulfil the purpose for which they were constructed, and the power of supply as it now exists is far in excess of the present requirements of the district.

The Proprietors will have observed that notice has been given by Government of a Bill for the purchase, by agreement or compulsion, of the Metropolitan Water-Works, and the transfer of the undertakings to a "Metropolitan Water Trust," and for the creation and issue of stock and for other purposes. The subject is one of vital importance to the Proprietors, and calls for and is receiving the most anxious and careful attention on the part of the Directors. They regret that the measure should be proposed at a time when so much has been accomplished for the perfection of the Company's works. They feel that their endeavours to carry out a responsible public duty have met with considerable success, and that absence of complaint in the district is in itself an assurance that that duty has been faithfully performed. The Proprietors may be satisfied that, in any action the Government may think fit to take in regard to this measure, their interest will, so far as it may lie in the power of the Directors, be zealously protected.

In conclusion, the Directors feel that the Proprietors may be congratulated on the steady advancement of the Company's revenue, and on the soundness of its financial position, and recommend that a dividend at the rate of 6½ per cent. per annum be now declared and distributed among the Proprietors of the ordinary stock on the 5th of January next.

Dr.—REVENUE ACCOUNT, FOR THE HALF YEAR ENDED SEPT. 30, 1879.

Maintenance.			
To Maintenance and repair of impounding and service reservoirs, filtering-beds, works, and pipes, or for obtaining and storing of water, including the cost of materials and labour	£718 8 6		
Maintenance and repair of mains, pipes, fittings, meters, and works connected with the distribution of water, including the cost of materials, labour, and renewals	1,535 9 8		
Pumping and engine charges, including cost of coals, wages, &c.	3,676 2 9		
Filtration, including the cost of materials and labour	398 19 2		
Salaries of Engineer, Inspector, Superintendent, and Clerks, and wages of Turncocks	2,087 7 7		
Thames Conservancy	1,300 0 0		
Rates and taxes, exclusive of income-tax	3,451 13 0		
		£13,168 0 8	
Management.			
Allowance to Directors	£600 0 0		
Allowance to Company's Auditors	39 7 6		
Salaries of Secretary, Accountant, and Office Clerks	995 18 0		
Superannuation of servants of the Company	430 2 0		
Commission to Collectors	1,067 3 2		
Stationery, printing, and general establishment charges	289 9 3		
Law and parliamentary expenses	160 11 2		
Official Auditor and Water Examiner	59 10 4		
		3,642 1 5	
Dividend and interest account for transfer of profits		30,808 12 5	
Balance carried to next account, to provide for losses		2,000 0 0	
		£49,618 14 6	

Cr.—REVENUE ACCOUNT.

By Balance brought from former account	£2,000 0 0		
Less sums written off as losses—viz.:			
Empty houses	£1,555 3 3		
Bad debts	107 18 9		
	1,663 2 0		
	£336 18 0		
Water-rates accrued to date of this account	48,381 0 5		
		£49,317 18 5	
Rent of houses and lands accrued to date and owing to the Company		294 6 1	
Fees received for registration of stock transfers, &c.		6 10 0	
		£49,618 14 6	

The GOVERNOR, in moving the adoption of the report, said it was stated in the second paragraph that the revenue from water-rents and other sources amounted in the half year to £50,384 9s. 1d. This was not the exact sum given in the accounts, which, as would be seen, was £49,618 14s. 6d. That, however, was supplemented by two items—interest accrued due to date on moneys deposited, £452 0s. 9d.; and interest accrued due to date on contingency-fund investments, £313 13s. 10d. Those two items added together gave the sum first mentioned of £50,384. It was also stated that the increase in the revenue was £714 11s. 8d., as compared with the corresponding period of 1878. This was not a large increase, but its smallness was principally owing to the badness of trade in the period referred to, and to the meter account being less. The decrease in the expenses of maintenance and management was, he was happy to say, something considerable, amounting to £1028 5s. 11d. The decrease was made up principally of smaller expenses for law charges, and the expense of distribution and pumping had been less. The increase in the capital account was owing to the expenditure for ordinary extensions, and in payment of the remainder of the cost of the auxiliary district-main, to which reference had been made on previous occasions. This was the main between Ebury Bridge and Stamford Bridge, which had been an expensive work, but it was now finished, and the money had been paid. A sum of £900 was included in the dividend and interest account, being the first half-yearly charge on the £40,000 of debenture stock which was raised in May of last year. With regard to the constant supply system, they had been doing a good deal of work in the new parts of their district, and in all new works they now always gave a constant supply. They were also giving it, when they were called upon to do so, in the older parts of their district. They need not volunteer to give the constant supply, because certain things had to be done by those who received it. Those persons had to make their fittings proper and suitable, and having done so, if they then called on the Company for a constant supply, the application was attended to. There was a large increase in building going on, as the Shareholders would understand when he told them that in Fulham alone the Company had supplied 273 new houses in the year ending September last. They had found great advantage from the waste inspection, and looking to the benefits accruing from it, they thought this expense was reasonably incurred. The inspection was still going on, and consequent on it they found a considerable reduction of the waste. With regard to the sixth paragraph of the report, the slight repairs therein referred to as being in hand had been completed and paid for. The "slight repairs" principally consisted of overhauling a pumping-engine at Surbiton. It was an engine which had been at work 26 years; and, with the small repairs done to it, it was still in a sound condition. As to the notice which had been given by the Government of a Bill for the purchase, by agreement or compulsion, of the Metropolitan Water Companies works, of course the Shareholders had all heard of it. He had in his hand the *Gazette* notice of the Bill, and he called attention to and read a few of the paragraphs in the notice. The Companies referred to were the eight Companies which took their supply, or part of it, from the Thames. He had drawn attention to the provisions of the proposed Bill, but he was not able to say anything further on the subject at that moment. The negotiations were still pending, and were quite unfinished. No conclusive agreement had yet been actually made with respect to it; but, as far as they could gather from the contents of the Bill, one could readily ascertain the purpose and intention of those who were promoting it. If any agreement connected with this matter should be placed before the Board, they would call a special meeting of the Proprietors, and everything that had been done would be submitted to them. He hoped they would regard the last clause of the report as satisfactory, and that the increase of dividend would not be unacceptable. The Company had been engaged for several years on some very extensive works; they had been raising and spending a sum exceeding £200,000 in altering their intake at Molesey, and on the works connected with that change; and they had also been spending a further sum of £20,000 on and in connection with works nearer home. Those works, and the contracts connected with them, had all been finished and paid for, and the Directors, therefore, felt they were well warranted in offering the Proprietors on this occasion an increased dividend of one-half per cent. upon the ordinary stock.

Mr. E. T. STORR seconded the motion.

Maj.-Gen. BOILEAU, in supporting it, asked the meeting to give their approbation to the accounts and the report laid before them. Of the accounts he said there could not be any doubt, because, though the Proprietors had every reason for having the utmost confidence in the Directors, the Auditors, and the Secretary, in regard to the accuracy of the figures, they had the further guarantee of the Government Auditor, Mr. Stoneham, who had scrutinized the accounts very carefully, and therefore there should be no hesitation on the part of the Proprietors in accepting them, and approving them as correct. He might venture also to make similar remarks with regard to the report. They might have wished that the increase in the revenue had been more than £714, but at the same time their works were not yet fully developed, and they might have a further increase still on that which they had received on the past half year. It was pleasing to find that, while this increase had not been so great as they might have hoped, the expenses had been reduced very considerably—by £1023—and this might be taken as an addition to the increase in their income, so that the two items together might be considered very satisfactory on the whole. They could have wished, as he had said, that the increase in the revenue had been more than £714, and no doubt it would be more in the future.

The SECRETARY observed that trade was so depressed, and the summer was so wet, that the meter account was very much affected by it, and there had been nothing like the usual increase in that item—indeed, it was only just level.

Maj.-Gen. BOILEAU said they could quite understand why the increase was not greater, but the decrease in the expenditure made up to some extent for the smallness of the increase in the revenue; and the Proprietors must feel obliged to the Directors for the attention which had been paid to their interests. As to the important matter which the Chairman had alluded to—the negotiations now going on with the Government—he was sure, with the satisfactory statement of accounts which had been presented to them, and the prospective advantages they might hope to derive from the state of their affairs and the condition of their works, that they might join with the Directors remarks in the report, where they said: "They regret that the measure should be proposed at a time when so much has been accomplished for the perfection of the Company's works. They feel that their endeavours to carry out a responsible public duty have met with considerable success, and that absence of complaint in the district is in itself an assurance that that duty has been faithfully performed." There could be no doubt that that duty had been faithfully performed, and the Proprietors were also reaping the benefit of it, though in a small degree, and the Company would reap still greater advantage if they were only allowed to go on. As to the prospect of not being allowed to go on, he thought they might join in the Directors regret that just at this time their property was likely to be taken from them. They could not, however, help the action of the Government, on whom heavy pressure had been brought in connection with the matter; and he believed the Government would have been glad not to have interfered with them. He was sure that they might have the utmost confidence in what the Directors said: "The Proprietors may be satisfied that, in any action the Government may think fit to take in regard to this measure, their interest will, so far as it may lie in the power of the Directors, be zealously protected." The Proprietors knew generally, and he knew particularly, how much care and attention the Directors had paid to this matter, and how well they had been assisted by the Solicitor, the Engineer, and the Secretary. They might, therefore, feel the utmost confidence that, whatever progress the negotiations might take with the Government, their interests would be most fully attended to. He was sure they would express their satisfaction with the Directors for the report and accounts they had submitted.

The GOVERNOR said he could endorse everything Maj.-Gen. Boileau had stated as to the assistance the Board had received from the gentlemen he had mentioned in connection with the negotiations with the Government. Their services had been most valuable.

The motion for the adoption of the report was then put, and carried unanimously, as were also resolutions receiving the accounts, authorizing the Directors to set apart out of the profits of the Company sufficient to pay the preference dividends due on the 5th proximo, and declaring the dividend of £6 10s. per cent. per annum on the ordinary stock.

Maj.-Gen. BOILEAU then moved a vote of thanks to the Directors, as well as to the Officers who had joined with them in bringing the Company's

affairs to the position they were then in, and observed that satisfactory as was the present position of the undertaking, it would shortly be still better. He was sure that the Proprietors felt very greatly indebted to the Directors and Officers of the Company.

Mr. JACKSON HUNT seconded the resolution, which was carried unanimously.

The GOVERNOR, on behalf of his colleagues and himself, thanked the Proprietors for the compliment paid to them on this as on previous occasions. They hoped it was not wholly undeserved. Their anxiety was, in common with that felt by the Proprietors, to carry on the affairs of the Company in a manner that was creditable, honourable, and prosperous. That was their wish, and he believed the Proprietors were good enough to credit them with it.

The proceedings then terminated.

METROPOLIS WATER SUPPLY.

Lieut.-Col. Bolton, in his report to the Local Government Board, on the water supplied by the Metropolitan Water Companies during last month, says: "The state of the water in the Thames at Hampton, Molesey, and Sunbury (where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, Chelsea, and East London Companies are situated) was good throughout the month. The highest flood state of the river at West Molesey during the month was 1 ft. 6 in., and the lowest 8 inches above the summer level, the rainfall at this place being 0·69 inch. The water in the River Lea was generally good during the month. [These remarks refer to the condition of the water previous to filtration.] The water at the intakes was generally in a much better condition during the month of November than it was in the previous month, and the filtration was efficient. The water supplied by the whole of the Metropolitan Water Companies was clear, bright, and properly filtered."

The following is Dr. Whitmore's report on the composition of the water supplied to Marylebone during November:—

November.	In Grains, per Gallon.							In Parts, per Million.		In Degrees.	
	Total Solid Matter.	Loss by Incineration.*	Chlorine.	Equal to Chloride of Sodium	Nitrogen as Nitrates and Nitrites.	Oxygen required for Oxidisable Matter.	Estimated Organic Matter.	Free Ammonia.	Albumenoid Ammonia.	Hardness.	Hardness after Boiling Fifteen Minutes.
West Middlesex	18·40	0·80	1·12	1·84	·123	·031	·248	·00	·06	12·9	3·9
Grand Junction	19·20	0·86	1·08	1·77	·121	·033	·264	·01	·07	13·2	4·0
River Thames at Hampton	20·80	1·00	1·20	1·97	·143	·049	·392	·01	·08	14·3	4·1

Temperature of West Middlesex water when drawn from the main 39·5° Fahr.
Temperature of the water taken from the River Thames . . . 47·0° Fahr.
Temperature of the Grand Junction water as drawn from the main 40·5° Fahr.

* The loss by incineration represents the amount of organic and other volatile matters contained in the imperial gallon (70,000 grains) of water. The total solid matter, *minus* such loss, consisted chiefly of carbonate of lime, with small quantities of other equally harmless salts.

The water of both Companies was perfectly clear and bright; that taken from the river was unusually clear.

OPENING OF THE TUNBRIDGE WELLS NEW GAS-WORKS.

Last Thursday, the formal opening of the new works of the Tunbridge Wells Gas Company took place in the presence of a large number of invited guests, and the proceedings throughout passed off in the most satisfactory manner.

At twelve o'clock the visitors assembled round the valve connecting one of the two new holders with the town main, and

Mr. R. P. SPICE, the Engineer to the Company, introduced the Chairman of the Board of Directors (Mr. E. M. Hunter), who, he said, would make a few remarks before proceeding to charge the main with gas manufactured at the new works.

Mr. HUNTER said that before he formally opened the works by turning the valve which admitted gas to the town main, he wished to say a few words. The land of the old works was bought by the Company, and the works opened on the 21st of August, 1843. The site was rather less in area than the retort-house which they now saw on the new works. At that time, and ever since, it had been used for the supply of gas for the district. It provided all that was then necessary; but as time progressed, extensions, of course, had to be made, enlargements were erected on additional ground, increased storeage had to be provided, and every requisite for an extended supply. The works went on increasing until at a certain time it was found that further extension was no longer possible there, and that there was an imperative necessity that a fresh site should be applied for. This caused the Directors some trouble and delay, but at last, on the 24th of July, 1876, the Royal Assent was given to a Bill, which enabled the Company to erect their works upon the present site—the site upon which they were then assembled. Having obtained their Bill, they decided to spare no expense which they considered to be requisite to make the works as perfect and as adequate as possible. When first the Company were started in 1843, they only carbonized in one year 400 tons of coal, but he had not the least doubt that they would find, on making up their accounts for 1879, that this small amount had been increased to something like 8000 tons. The Engineer (Mr. Spice), whom they had heard introduce him on the present occasion, would be very happy to show them the new works and everything connected with them. Of course, Mr. Spice was able to go much better into details than he could, and as they followed him round they would be able to understand the character of the various appliances far better than by any explanation he (Mr. Hunter) or anybody else could give. With regard to the opening of the works at the present time, he would state that when they were taken over originally by the Company, in 1843, there were none of those appliances which were to be found in operation at the present works. He did not know what the late Chairman of the Company (Mr. Joseph Delves) would have thought, with his old-fashioned ideas of the way in which retorts were filled, when something like 2 cwt. of coal was shot into the retort at once. He did not think Mr. Delves or any other Director would have attempted, or dreamed of such a course. Those present would be able to see the process of charging the retorts by West's patent system, and the little labour it was, comparatively speaking, to the workmen. He, in conclusion, said he was sure it would be a great pleasure to the Directors to see the Shareholders at the works at any time, and all he could say was that they sincerely hoped the blessing which had accompanied them in times past might be with them in the future.

With the assistance of Mr. G. Scott, the Company's Manager, Mr. Hunter turned the gas into the main which supplies the lower part of the town, and thereupon declared the works formally opened.

An adjournment then took place to the retort-house, where Mr. SPICE delivered a most interesting address on the origin and progress of the use of gas for lighting purposes; and the marked attention paid by those present testified to their appreciation of the able manner in which the subject was placed before them.

An inspection of the works was afterwards made, under the guidance of Mr. Spice, who explained the uses of the various parts of the apparatus already erected. Before mentioning any of the details of the works, it should be stated that the general effect, especially when viewed from the railway, which immediately adjoins one side of the site, is very pleasing. The end elevation of the coal store attached to the retort-house is in the forefront; while the range of buildings, consisting of the station-meter house, stores, &c., with the condenser and combined scrubber-washers on the right and the gasholders on the left, is beyond.

The retort-house proper is 200 feet long by 65 feet wide, and about half the space is occupied with benches of retorts, either in operation or being completed. The house is arranged for the use of West's system of drawing and charging, and the results obtained on Thursday were very satisfactory. The retorts are throughs, blocked in the middle, so that two sets of drawing and charging machines are at work. At the end next the coal store are fixed the endless chains of buckets for supplying the hoppers of the charging-machine, also the coal-crushing machine. The coal store, which is 200 feet long by 40 feet broad, forms, with the retort-house, an inverted T-shaped building. In it is an elevated line of rails (the trucks for conveying the coals being lifted by a hydraulic lift at one end), so as to enable a large supply to be stocked without inconvenience. On one side, at the junction of the retort-house and coal store, is the engine and boiler house, an ingenious hopper arrangement being fixed for the supply of the necessary fuel from the retort-house. On the other side is the men's dining-room, and this has been fitted with cupboards, in which it is proposed to place a small library that Mr. Spice intends to form for the use of the men. Another commendable thing in this part of the works is that, in addition to the lavatories, closets, and urinals, there have been fixed three full-length porcelain baths, supplied with hot and cold water, the use of which will, no doubt, be much appreciated by the men. At the farther end of the retort-house is the exhauster-house, fitted with two of Körting's patent steam-jet exhausters.

Immediately beyond this is one of Morris and Cutler's patent condensers, with two pairs of fourteen rows of 15-inch cast-iron horizontal pipes, enclosing 4-inch wrought-iron water-supply pipes. This is so arranged that, at will, one-half of the apparatus only need be used. At each end of the condenser is one of Cutler's patent scrubber-washers, of very ornamental design. These are ascended by means of a spiral staircase round each, the centres of the spirals being utilized as the outlets from the scrubbers. There will be an ornamental railing surrounding the platform that joins the two scrubbers, and gives access to the cistern above the condenser.

Beyond this again are the purifiers, four of which are in action, and two more will be brought and fixed as soon as the manufacture of gas at the old works is discontinued, and the plant removed so that the site can be sold.

To the left of these is the building containing the Manager's office, the station-meter room—which is a handsome apartment, lighted from the roof by means of stained glass windows, while the floor at the entrance is laid with tesselated pavement—and the testing-place, with stores above. The station-meter in use is capable of passing 40,000 cubic feet per hour, and there are two 15-inch station-governors. In the testing-room, besides the usual apparatus, there is placed a telephone in connection with the offices in the High Street. Above this there are two rooms to be used as stores—the upper one being in the tower, which will contain an illuminated clock.

On the left of this building are the holders, of which there are two—114 feet by 30 feet—with wrought-iron standards. The tanks are of brick and concrete, but with cast-iron dry wells, these being 12 feet in diameter.

In the yard is a 3-ton hydraulic lifting crane, for unloading goods from, or into the railway waggons, the rails extending as far as this; while beyond it is intended to lay a series of narrow-gauge tram rails to all parts of the works. The foundations for future offices, forming part of the original design, are also finished. Two leading mains have been laid from the works—one to the high parts of the town, and the other to the lower-lying districts.

It should be mentioned that Messrs. S. Cutler and Sons, of Millwall, supplied the retort-house main; the connecting-mains all over works; the iron tar-tanks; the holders; and (as already mentioned) the condenser and washer-scrubber. Messrs. S. Owens and Co., of Whitefriars, supplied the various valves (Mann and Owens patent); the steam-pumps (Blake's patent), for the tar and ammoniacal liquor tanks, and for the scrubbers and condenser; the pressure-pump (also Blake's patent) for the hydraulic lift; and the steam-engine, boilers, and all steam-pipes. Messrs. John Abbot and Co., Limited, of Gateshead, supplied and erected the hydraulic crane, and the valves and pipes for lifting the purifier-covers; besides which they have orders for the erection of sulphate of ammonia plant on the system in use at Newcastle and Carlisle. Messrs. Alex. Wright and Co., of Westminster, supplied the station-meter, the station-governors, and the various pressure-gauges all over the works. Messrs. E. Cockey and Sons had the contract for the purifiers and their lifting gear.

Besides the attention bestowed on the visitors by Mr. Spice, the Secretary of the Company (Mr. John Read) and the Manager (Mr. Scott) were indefatigable in seeing to the comfort of those present, and giving information where needed.

In the evening a dinner in celebration of the event was given in the Great Hall, presided over by Mr. William Delves.

GAS APPARATUS EXHIBITION AT PAISLEY.

(FROM OUR OWN CORRESPONDENT.)

Following in the wake of Greenock, and various towns in England, Paisley is now enjoying the pleasures and benefits of an exhibition of gas apparatus, under the auspices of the Gas Committee of the Town Council, the practical working out of the idea having devolved upon Mr. George R. Hislop, F.C.S., the able and popular Manager of the Corporation Gas Works of the town. The exhibition was opened last Tuesday in the Drill Hall, in the presence of the municipal authorities and many of the leading inhabitants. The place chosen for the exhibition is eminently suitable for the purpose, being several times as large as that in which the Greenock Exhibition was held recently, and in that respect Mr. Hislop has been specially fortunate. There is plenty of room for the exhibitors to display their valuable wares to advantage, while there is also an abundance of space for the visitors to promenade about between the lines of stalls; and, in addition, there is a high open roof with every facility for promoting ventilation, which is no mean consideration, when it is remembered that an enormous amount of gas is being constantly consumed, and that the joints of the pipes are not absolutely tight and free from escape.

Provost MACKEAN occupied the post of honour on the occasion of the opening ceremony, and from his practical and scientific knowledge, as being prominently identified with one of the chemical industries of the town, he was able to deliver an opening address of a very pointed and appropriate character.

Bailie McGown, Chairman of the Corporation Gas Committee, next delivered a short address. He said it was gratifying to all who had taken an interest in preparing for the exhibition that it opened with such a good prospect. The exhibition was in a great measure the outcome of the energy and enthusiasm in the pursuit of his profession which marked their excellent Manager, Mr. Hislop; and it must be very gratifying to him that so many prominent makers of gas apparatus should have responded to his invitation to send exhibits to the hall. The purposes to which gas was applied were now very numerous, and were becoming increasingly so. In fact, it seemed as if the many uses to which gas could be applied were only now apparent. In these days, when so much attention was given to cooking lessons in connection with schools and otherwise, such an exhibition of gas-cooking apparatus as was there shown could not but be instructive and useful. The application of gas to produce motive power was also well illustrated in the exhibition, and would no doubt claim the attention of their intelligent townsmen; and its application to the heating of apartments of various kinds was equally well illustrated by some of the exhibits. The propriety and economy of using regulators in the consumption of gas would also be clearly shown in the exhibition, by experts who had made the subject their study for many years.

Provost MacKean then formally declared the exhibition open, and the company dispersed over the hall to make an inspection of the exhibits.

To a certain extent, the exhibition was in an imperfect state at the opening; but the visitors generally felt abundantly interested by what they saw and heard, and in many cases they were most agreeably surprised at the fulness, variety, and excellence of the numerous collections of objects laid out at the stalls. Since the opening day the exhibition has become more and more complete from day to day, and such as to justify me in attempting a brief description of its most salient features.

As at the Greenock Exhibition, and as doubtless on most other similar occasions, the leading feature of the display is the collection of cooking-stoves, in which department most of the well-known manufacturers of such articles are represented, either directly or by local agents. The Argyle Ironmongery Company of Glasgow have certainly one of the finest collections in this department. Perhaps the most novel exhibit is what is called a Combination Gas and Coal Kitchen Range, one-half of which is worked with coal gas, and the other from an ordinary coal fire. In the oven of the former a very regular heat is kept up, and the top is fitted with boiling-rings, as usual. In the case of the coal fire getting low, or in summer, when little fire is wanted, the gas oven is immediately made available. The consumption of gas is about 20 feet per hour, the cost of which is 1d., and this is quite sufficient for the cooking requirements of a large family. There is also a smaller range with a gas oven at one side and a coal-fired boiler at the other. A considerable number of both sizes of ranges have recently been fitted up for private families. The Company likewise exhibit a large range with three gas-ovens, and seven boiling-rings on the top. This range measures 5 feet 6 inches in length by 26 inches in breadth, and is intended for a large public institution in London, a fact which reminds one of the common saying—"Sending coals to Newcastle," as Glasgow was much after London and other towns in England in commencing to manufacture gas cooking-ranges on any considerable scale. It is the second of the same size sent to that institution. Another large range, having two ovens, is shown, which is to be used in a Glasgow restaurant. The only other exhibit which I shall specify is a very nice heating-stove for halls, churches, &c.

Practically, all the other exhibits in the shape of cooking-ranges and stoves are from across the Border; and first in order I would briefly refer to the collection of Messrs. Leoni and Co., London, represented by Mr. W. M'Arthur, Paisley. It is of very considerable extent and variety, and scarcely needs any special description, as the manufactures of the firm have become so thoroughly established in public estimation. Not the least attractive item in this collection, after the cooking-stoves, is the platinum gas fire, which is such an excellent imitation of a nicely-trimmed coal fire in a parlour or bed-room grate. It is worthy of mention, that the cookers, &c., in this collection are constructed for rich Scotch cannel gas.

Messrs. Beverley and Wylde, of Leeds, are in strong force with their varied exhibits, and fresh from the Nottingham Exhibition with their well-won honours. Their "Beverley" double-cased gas-cooking apparatus is specially admired for the excellence of its structural arrangements and for its economy in use. This particlar gas cooker is fitted with one of Stott's improved mercurial governors, by which the most perfect regularity of action is ensured. As tested in my presence, the supply of gas was at 1 inch pressure, which was proved to be amply sufficient.

The "Sun-Dial" cooking, boiling, and heating stoves of Messrs. Billing and Co., exhibited by Mr. Joseph Thomson, Paisley, are also numerous and varied in character. To most of the visitors the firm's well-known "Cheerfuls" prove to be very attractive.

At the stand of Messrs. Wright and Co., Birmingham, which is taken charge of by Messrs. Eadie Brothers, Paisley, there is a very full assortment of the approved manufactures of the Essex Works, in the shape of cookers with and without boilers, one being of very large size for a hotel or restaurant; boiling-stoves, heating-stoves, &c.

Mr. J. Williamson, London, who is specially represented by Messrs. P. Watt and Son, Glasgow, has an extensive collection in which cookers and "Cheerfuls" bulk very largely. One of the former, known as "The Handy," is specially worthy of commendation, which is also equally true of "The Duplex." Probably the most novel exhibit is a public-house bar or restaurant stove, fitted with a nickel silver 3-tap urn.

An excellent assortment of gas apparatus is brought together at the stand of Mr. Charles Wilson, Leeds, including more especially artizan and family cooking-stoves, at least two of which had prominent places in the awards at the Nottingham Exhibition. The Wilson gas fire, in which platinum wire is freely used, comes in for a large measure of consideration and approbation.

I may now pass to notice briefly the collections of exhibits connected with the measurement of gas, the regulation of the pressure to the consumers, and the consumption of gas in lighting operations. Not the least interesting stand in respect of meters is that of Messrs. George Glover and Co., who show one of their patent dry gas-meters in a glass case—certainly a very fine piece of workmanship as an instrument of the utmost precision. Messrs. Alder and Mackay, Edinburgh, also exhibit an excellent specimen of their manufactures, in the shape of a dry meter in glass case. Close by there is likewise a dry show meter, exhibited by Messrs. W. and B. Cowan, Edinburgh, whose collection also contains a show meter on Warner and Cowan's patent. In the same group of exhibits there is still another meter in glass case—namely, one on Henderson's patent, from another Edinburgh firm, Messrs. Henderson and Dickson. It is an example of the fountain meter, the action of which, in filling from the fountain to the case, never affects the steadiness of the lights supplied by it. The high and low lines of the meter in measurement are never affected, even though as much as ten gills of water be withdrawn from the meter having a 3-light capacity.

Messrs. D. Bruce Peebles and Co., Edinburgh, add greatly to the interest of the exhibition by showing a collection of objects containing a house governor, needle lamp governor, stands, fittings, &c., together with apparatus for demonstrating the influence of pressure on gas-burners, and mercury gas-governors.

Messrs. Stott and Co., of Oldham, have a well-equipped stand, at which they exhibit their mercury-tight self-acting gas-governors, which I formerly noticed in connection with the Greenock Exhibition, and regarding which there are excellent reports from persons who now have them in use at Greenock. On this occasion there is connected with the stand a gas-holder of considerable capacity, by means of which a variety of interesting demonstrations can be witnessed in illustration of the complete efficiency of the governor.

The dry gas-regulator invented by Mr. William Tice, of Southport, is also shown in operation at one of the stands. I should mention that this instrument is very favourably regarded by many people in Scotland who have it in use.

Mr. John A. Hope, Engineer, Glasgow, exhibits a variety of Bickerdike's regulator, which likewise bears a good reputation in Scotland.

Lastly there is the patent governor of Mr. John Busch, of Oldham, which is exhibited by Mr. George Robertson, Paisley. As many professional gasmen are aware, this also works on the mercurial system.

Of burners, reflectors, &c., there is a great amount of variety in the exhibits. In the ground in front of the Drill Hall, Mr. Wm. Sugg (represented by his agent, Mr. D. M. Nelson, Glasgow) shows one of his famous Argand burners of 300-candle power, in use in one of his ventilating lanterns; and a similar one, with opal reflector, is in use on a pillar inside the hall, where there are also two of 80-candle power each. Mr. Nelson's stand inside is really one of the sights of the exhibition, alike as to its extent and variety and the beauty of many of the exhibits, which it is scarcely necessary to indicate and far less to detail.

Standing as a *vis-à-vis* to the Sugg lamp outside, there is one containing a specimen of Messrs. Bray and Co.'s flat-flame burners, designed to give 150 to 160 candle power, and governed to consume 27 feet per hour of 28-candle gas. Messrs. Bray and Co. also have a most interesting and attractive stand inside the Drill Hall.

Barwell's gas-lighting appliances, including Fisher's duplex burner, Webster's patent photometer, &c., are shown by Messrs. Barwell, Son, and Fisher, through their local agent, Mr. R. Pinkerton, Paisley.

The lady visitors to the exhibition are generally much interested in the patent ironing apparatus, which is shown in actual use at two separate tables by the Air-Burning Company, Limited, of Glasgow. The apparatus includes an arrangement whereby gas is burned on the Bunsen principle in the interior of a smoothing-iron while in use. In one case the operator works the necessary blast of air by a constant to-and-fro motion of the swaying body on a simple bellows arrangement; and in the other it is obtained from a small fan driven by a Bisschop gas-engine. This leads me to mention that there are three gas-engines in the exhibition, the other two being Otto engines, made by Crossley Brothers, and exhibited by Messrs. P. Watt and Son, Glasgow. The lesser one, of 1-horse power, is sold already; the other is one of 3½-horse power; and they are driving respectively five Wheeler and Wilson sewing-machines and a "Minerva" platten printing-machine. The Bisschop engine is shown by Mr. James Brownlie, the Glasgow agent.

Messrs. James Boyd and Sons, hothouse builders and heating engineers, Paisley, do good service by showing how gas may be economically used for heating a conservatory. They exhibit an apparatus which is suitable alike for heating an entrance-hall, a lobby, or a small conservatory. It consists of a small boiler, the inside of which is fitted with copper tubes heated by gas, and of a stack of ten rows of cast-iron pipes, 4 feet long and 3 inches in diameter, attached to the boiler. In about 1½ hours after lighting the gas all the water has become so well heated as to be far above the temperature of the body; the gas can then be turned down, and the apparatus left in working order as long as it may be required, without any attention whatever. The space occupied by it is a mere bagatelle, and it seems that the cost for gas is only about a halfpenny per hour.

In conclusion, I should state that the Paisley Gas Corporation very appropriately show an interesting collection of objects, including several specimens of rich gas coal—Lesmahagow cannel, giving 13,000 cubic feet of 34-candle gas; Wigan coal (Orrel Mine), which yields 12,445 feet of 15·45-candle gas; Australian Boghead cannel, said to yield 17,000 feet of 45-candle gas; English Boghead cannel, yielding 13,300 feet of 34·5-candle gas; and Scotch Boghead or Torbanehill cannel, the yield of which is 16,000 feet of gas, having an illuminating power equal to 40 standard candles. This collection also embraces two of the oil lamps used in the town prior to the introduction of gas, in the year 1824. They are made of tin plate, of circular form, about 3 inches in diameter, and with a rim standing up about ¾-inch. Two spouts are soldered on at opposite points on the circumference, for the passage of the wick from the oil reservoir to give the flame. These lamps excite much interest as a remnant of the semi-dark ages. The only other exhibit at the Corporation stall is an ornamental pressure-register to which a timepiece is attached. The register tells the pressure of the gas at any time of the day or night when gas is being consumed in the Hall.

At this point I must, for the present, conclude. In another notice—necessarily a brief one—I may have a few gleanings yet to mention from this most interesting exhibition.

WEST'S SYSTEM OF DRAWING AND CHARGING RETORTS.

At the opening of the Tunbridge Wells New Gas-Works, referred to on another page, West's machinery for drawing and charging the retorts came in for a large share of attention. It may not, therefore, be out of place to give some details of results obtained at Maidstone by the use of the machinery.

The gas made per ton of coal carbonized has been—

	Cubic Feet.	Illuminating Power.
1875—Old system.	9,750	14¼ candles.
1876—20 per cent. of works under new system .	10,177	15 "
1877—60 " " " .	10,420	15 "
1878—All the works " " .	10,800	15¼ "
1879 to Oct. " " " " .	11,054	15 "

The wages of the coal wheelers, stokers, and coke quenchers, per 1000 cubic feet, under the old system, was 3·34d., while under West's system it is 1·5d.

The yield of gas per mouthpiece is more than 8000 feet per day of 24 hours, as against 5000 feet on the old scoop system.

In 1875, before West's machinery was introduced, 4 per cent. of cannel was used; but, during the year ending June 30 last, the consumption of cannel was only 0·61 per cent.

REDUCTION IN THE PRICE OF GAS AT BARROW-IN-FURNESS.—The Gas Committee of the Barrow-in-Furness Corporation have resolved that on the 1st of January next the price of gas shall be reduced 1s. per 1000 feet—that is from 5s. to 4s.—and that the meter-rents shall be lowered 50 per cent.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

A tolerably good business is being done in the coal trade of this district, and there is much tendency towards increased stiffness in prices, slight advances upon late rates being in many cases asked from new customers, but in the general quotations there is no material alteration. The better classes of round coal are meeting with a good demand for house-fire purposes, and the commoner qualities are also moving off pretty freely, the increased activity at the local iron-works causing a larger consumption of forge classes of fuel. Engine classes of fuel are also not the drug that they were a short time back, and good slack especially is now meeting with a very fair demand, colliery proprietors, as a rule, being able to move off their present production without difficulty. Prices at the pit mouth remain about as under:—Best Wigan Arley, 9s. to 9s. 6d.; inferior sorts, 7s. to 7s. 6d.; Pemberton four-feet, 6s. 6d. to 7s.; common round coal, 5s. 6d. to 6s. 6d.; burgy, 3s. 9d. to 4s. 3d.; good slack, 2s. 9d. to 3s. 3d.; and common, 2s. to 2s. 6d. per ton.

The shipping trade is moderately active, with slightly better prices being obtained.

The improvement in the demand for coke continues, iron-works now taking increased quantities of this class of fuel; and although prices are not quotably higher, there is a firmer tone in the market.

Some of the Lancashire collieries have not been able to work so regularly as they might have done, owing to the temporary interruption of the mineral traffic on the railways and canals by the recent fogs and severe weather; but generally there are sufficient orders coming to hand to keep the pits going full time.

The agitation for an increase of wages is spreading throughout the Lancashire mining districts, but as yet no concessions in this direction have been made by employers, and there will have to be a more substantial improvement in prices before the colliers can hope to command any higher rate of wages.

In the iron trade prices continue to stiffen, and although the quantity of iron actually being sold is not large, buyers who have now to come into the market have to pay a considerable advance upon late rates. Lancashire makers of pig iron have made a further advance of 2s. 6d. per ton on their list rates, and for delivery into Manchester and the district, No. 3 foundry and No. 4 forge are now quoted at from 60s. to 61s. per ton, less 2½ per cent. For Lancashire bars, delivered into the Manchester district, £8 per ton is about the lowest price at which orders could be placed, and some of the makers will only book orders subject to the prices ruling at quarter-day.

There is no marked improvement in the position of founders, engineers, and machinists; but generally they are better off for work, and there are less men out of employment in the district.

THE COAL AND GENERAL TRADES OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

There was on the Tyne an active demand from London for gas coals last week. The pits working the very best sorts were kept busy, but some collieries were unable to supply themselves with the requisite amount of steam tonnage, through the fogs which prevailed to the south of Flamborough Head having kept the ordinary steam colliers, running between the Tyne and London, very much behind time. Higher freights had to be paid steamers to induce them to enter the trade. The price of gas coals keeps very firm at fully recent quotations. The shipping-places will be very busy the first three days of this week, in getting coals away before the Christmas holidays commence. Within the last ten days there have been numerous inquiries from abroad at Newcastle with regard to the prices likely to be paid next year for coking coals. Several contracts were made by German houses for a supply, at an advance in prices, over next year. A good deal of business is likely to be done in that direction.

There is a material improvement to note in employment in the Cleveland iron district. Most persons fully acquainted with the inner life of trade in the North of England are thoroughly convinced that the gain recently made in the iron trade is substantial, and that it will be stronger next year. Under these circumstances there is every probability of a large business being done in the supply of coke to the blast furnaces; hence at the present moment that class of fuel is in a stronger position in the market than it was six weeks ago. The prospects of the steam coal trade keep good for next year. The price of the latter for delivery after March is higher.

The principal business done in shipping last week was coastwise. Numerous vessels were engaged to load gas and other coals to the byeports. Amongst them were several German and Russian brigs which have come into our coasting trade for the winter. Coasting rates for gas coals were a little stronger where prompt and handy sailing ships were needed.

The price of lead and all other metals keeps high. Pig lead is sold on the Tyne in large parcels at over £18 per ton. Red lead is also high. Spelter is quoted in the market at over £20 per ton. The chemical market was quiet all last week.

The ice was cleared from the upper reaches of the Tyne last Wednesday, navigation was free, and fire-bricks and other goods were brought down and shipped.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

For some time back the supply of gas at Slamannan, an important mining town a few miles from Airdrie, has been very defective, in consequence, it is alleged, of the improper management of the gas-works. During most of the week before last the north part of the town had no gas at all, and the principal inhabitants have cut it off, and are using oil instead.

A meeting of the intending Shareholders in the proposed new Gas Company for Buckhaven, in Fifeshire, was held on Saturday week, for the purpose of adopting rules and electing Directors. Mr. S. Youden, of Leven, submitted the Memorandum and Articles of Association, which were duly considered, slightly amended, and adopted, the same to be printed and registered without delay. Nine Directors were elected to carry out further arrangements, and to call the next general meeting with as little delay as possible, so that the erection of the gas-works might be proceeded with at once, and that the inhabitants might at an early date participate in the advantages to be derived from such an important undertaking.

The Directors of the Kinross and Milnathort Gaslight Company, at their quarterly meeting held on Saturday week, had under consideration complaints as to the supply of gas both in Kinross and Milnathort. After carefully considering these complaints, the Directors were satisfied that the deficiency was not attributable to the quality of the gas, but arose entirely from the quantity being defective in the gasholder in the Myre, upon which, from its position, the supply in the town of Kinross chiefly depends, and that this cause was much aggravated by the late keen frost. The Directors resolved to devise means for increasing the pressure in both towns by introducing pipes of considerably larger diameter at the outlets from the gasholders, and it is hoped that by these means the present cause of complaint may be removed. Unfortunately the proposed remedy will not be applied until next summer, as the pipes cannot be interfered with during the winter season.

Further consideration has been given to the question of providing additional storeage accommodation at the Montrose Gas-Works. On Friday, the 12th inst., the Managing Committee of the Gas Corporation considered several plans that had been proposed to meet the emergency, one of them, which had been suggested by Mr. Gillespie, of Messrs. Laidlaw, Sons, and Caine, Glasgow, being the removal of one of the three holders at present in use, and the substitution of a new one of three times its capacity. The expense of the scheme, including that of the new holder, was estimated at upwards of £5000. Before coming to any decision upon the alternative plans, it was agreed that the Manager should at once proceed to Glasgow and Kilmarnock to make inquiries, more especially as to the propriety of telescoping one of the existing holders—a plan which was favourably considered. The subject was again brought up at a meeting of the Gas Commission, held on Monday, but nothing was definitely settled.

At a meeting of the Greenock Water Trust held last Tuesday, a report was submitted by the Superintendent, which stated that the cost of the Loch Thorn extension works up to the 27th of November was £6062 4s. 3d. The works have been suspended till the spring.

At a meeting of the Glasgow Corporation Water Commissioners held last Thursday, an abstract was submitted of the results of the night inspection of water-meters from the 30th of October to the 13th of November, showing that the total average at starting of the meters was 49 gallons per 24 hours; on the 13th of November, 33·6 gallons—a saving of 15·4 gallons. On the population of 81,462, this amounted to 1,254,514 gallons in the 24 hours. In the course of a conversation in reference to the refusal of two firms to pay for the execution of repairs made on water-meters used by them, it was stated that there were about 2000 meters in the hands of consumers all over the city.

A very large amount of business was done in the Glasgow pig iron market last week. As high as 61s. 6d. cash was paid on Thursday, and even up to 62s. 3d. was paid on Friday.

The coal market still suffers from the dispute between the miners and coalmasters in certain districts of Lanarkshire, and the ironmasters who care to send coal into the market are getting almost any price they care to ask.

Brighton Corporation Water Supply.—At the meeting of the Brighton Town Council, last Wednesday, it was reported that the whole of the works authorized by the Corporation last year in connection with the water supply of the borough had been practically completed, at a cost of about £12,000. This work consisted principally of the laying of new mains, and virtually formed part of a comprehensive scheme, the carrying out of which has provided the town with a duplicate water service. The entire scheme has cost nearly £50,000. The supply, drawn as it is from the watershed of the Downs, is practically inexhaustible, and each of the two engines at the surface is capable of pumping up sufficient water for the supply of the town. The quantity of water used daily is over 2 million gallons, and the reservoirs have a capacity of nearly 6½ millions.

Heywood Local Board Gas-Works.—At the meeting of the Heywood Local Board on Monday, the 8th inst., the Gas Committee's minutes, which were presented, stated that it had been resolved to request Mr. T. Newbigging, C.E., of Manchester, to make an examination of the works, and report thereon. Mr. Buckley, who moved the adoption of the minutes, said that the Committee came to this resolution in consequence of a report by the Manager that it was necessary to put in new purifiers. The Committee thought it would be as well, before there was anything done, to have the opinion of an independent person upon the state of the works. The present purifiers had been in use something like 25 years. At the time they were put in the works were producing something like 23 million feet of gas per annum. At the present time the production was something like 60 millions; and it would thus be seen that if the present purifiers were only calculated for a production annually of from 20 to 30 million feet, they must at the present time be far too small. The Manager had reported that at present he had to change the material every eight hours; formerly he only did it every three days, so that the extra cost, both in material and in wages, was considerable.

The Metropolitan Gas Company of Melbourne.—This Company have recently been applying in England for a loan of £60,000, secured by debentures bearing interest at the rate of 6 per cent. The Company is an amalgamation, under the Act 41 Vict., No. 586 (Colony of Victoria), of the three Companies formerly supplying gas in Melbourne—viz., the City of Melbourne Gas and Coke Company, which had been established 25 years; the Collingwood, Fitzroy, and District Gas and Coke Company, which had been in operation 17 years; and the South Melbourne Gas Company, of more recent origin. The united paid-up capital amounted to £557,210. The revenue of the Company for the half year ending June 30 last was £109,657. Under their Act, the Company are empowered to borrow on debenture any sum not exceeding the amount of their paid-up capital, but at the present time have only borrowed £171,000. The dividend declared by the Company on their ordinary stock for last half year was at the rate of 8 per cent., leaving a balance to the credit of the half year's working of £5498 6s. 3d., which, with the amount brought from the previous half year—£5929 0s. 11d.—gave £11,367 7s. 2d. to be carried forward. The tenders for the loan were opened last Tuesday, at the London branch of the National Bank of Australasia, and amounted to £104,600, at prices from £103 1 s. to £105. Tenders at and above £103 10s. 6d. receive allotments in full, and those at £103 10s. about 25 per cent.

Opening of the Burslem Sewage Works.—Last Tuesday the pumping-station of the sewage-works at Burslem was opened by the Mayor (Mr. J. Maddock), in the absence of the Duke of Sutherland, who had been invited to perform the ceremony, but was unable to attend. The mode which has been adopted for finally disposing of the sewage is irrigation, for which purpose a farm of 314 acres has been leased at Bradwell, about two miles from the borough boundary. The pumping-station is in the valley between the railway and Middleport. The sewage is intercepted at different points, and conveyed by gravitation to the pumping-station, by means of two intercepting sewers. The high-level sewer passes over, and the low-level sewer under the Fowler Brook. The sewage, when it reaches the well, is forced up cast-iron rising mains, 2 miles long and 21 inches diameter, and gravitates over the farm. The two powerful horizontal compound condensing engines are capable of pumping 24 hours flow of sewage to the highest point in 8 hours, working easy, or in 5 hours when in full steam. High and low pressure cylinders, 23 inches and 46 inches in diameter, are provided. The fly-wheel is 22 feet in diameter, and weighs nearly 15 tons. The engines may be used either together or separately; the pumps are double-acting, and the air-vessel is 15 feet high and 5 feet diameter inside. The works were designed by Mr. E. M. Richard, C.E., the Borough Surveyor, and have been constructed at a cost of about £25,000.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

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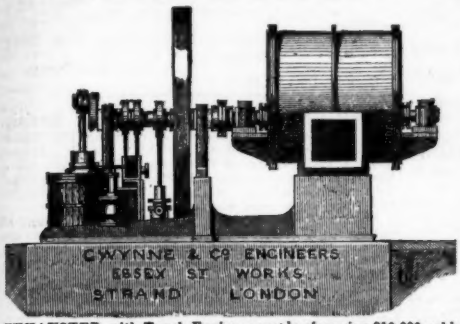

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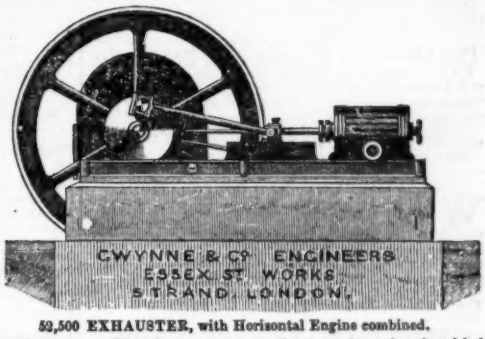

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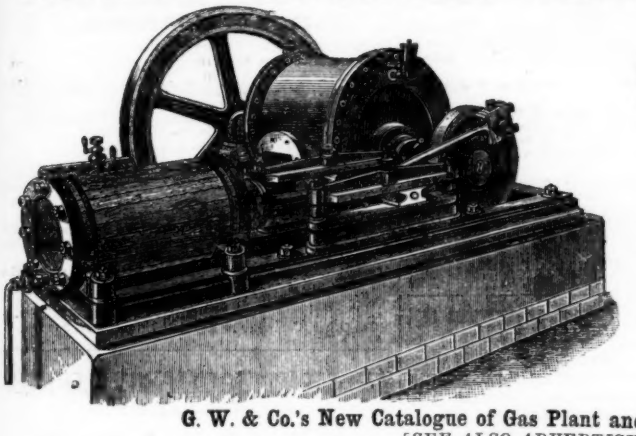
Wrought-Iron Spindles and ENGINES COMBINED.



SOLE MAKERS,

GEORGE WALLER & CO.

MAKERS OF ENGINES, EXHAUSTERS,
INDEX AND DISC GAS-VALVES,
HYDRAULIC MAIN VALVES,
BYE-PASS VALVES,
TAR, LIQUOR, AND OTHER PUMPS,
SCRUBBERS AND PURIFIERS,
CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.
[*SEE ALSO ADVERTISEMENT, PAGE* 998.]

Phœnix Engineering Works:
HOLLAND STREET, SOUTHWARK, S.E.

Now Ready, Price One Guinea,

PRECEDENTS IN PRIVATE BILL LEGISLATION

AFFECTING GAS AND WATER UNDERTAKINGS.

COMPILED BY MR. G. W. STEVENSON, C.E., F.G.S.

LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

Now Ready, Handsomely bound in Morocco gilt, cloth sides, gilt edges, Vols. 1 and 2 of

KING'S TREATISE

ON THE

SCIENCE & PRACTICE OF THE MANUFACTURE & DISTRIBUTION OF

COAL GAS.

EDITED BY THOS. NEWBIGGING, C.E., M. INST. C.E., AND W. T. FEWTRELL, F.C.S.

VOL. I. contains 460 pages of Letterpress, and is illustrated by 521 Woodcuts and 36 page and double-page Engravings, printed on Plate paper, and a full-page COLOURED ENGRAVING of the BECKTON GAS-WORKS, forming a frontispiece to the Work.

VOL. II. contains 470 pages of Letterpress, and is illustrated by 355 Woodcuts and 28 page and double-page Engravings

Price of each Volume, 28s.

ORDERS RECEIVED BY

WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.

WANTED, Readers of the NEW Edition, 1879, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

HARWICH (ESSEX) GAS AND COKE COMPANY.

WANTED, a Foreman of the Works of this Company.

Applications to be made in writing to the SECRETARY of the Company, HARWICH.

WANTED, a Partner in a Gas-Burner Manufactory, making several specialties in Gas and Electrical Engineering. To a gentleman capable of taking the commercial part of the business this is a good opening.

Write, stating amount of capital at command, to A. W. and Co., Post Office, WEST BROMWICH.

None but Principals or Solicitors treated with.

TO GAS COMPANIES AND CORPORATIONS.

WANTED, by the Advertiser, a Situation as SECRETARY and MANAGER of a small Gas-Works, or ASSISTANT MANAGER of a large Works. Has had every experience in a large Gas-Works. Advertiser's only reason for wishing to leave present situation is to better himself. Good references and testimonials.

Address No. 606, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OLDBURY BOARD OF HEALTH GAS-WORKS.

CLERK OF WORKS WANTED.

WANTED, by the above Board, a person accustomed to Inspecting and Superintending Building operations, and the Erection of Gas-Works, to act as CLERK OF THE WORKS.

Testimonials, with amount of salary required, to be sent to Mr. A. Upward, 8, Queen Anne's Gate, Westminster, S.W., not later than the 29th of December inst.

By order,
ARTHUR WRIGHT, Clerk to the Board.

Board Room, Oldbury, Dec. 9, 1879.

TO MANAGERS AND SECRETARIES.

AN Experienced Gas Office Clerk, aged 23, thoroughly conversant with the several duties of Book-keeper, Cashier, or Collector, desires Re-engagement. Unimpeachable references.

Address STEPHEN, 79, Broke Road, Dalston, LONDON, E.

SOFT STEARINE PITCH.

TENDERS Wanted for about 160 Tons, to be delivered during 1880, in 5-ton Lots (to rail or steamer in Bristol), gross weight; net cash.

Tenders to be addressed, not later than the 31st of December inst., to CHRISTR. THOMAS AND BROS., Broad Plain Soap and Candle Works, BRISTOL.

TO BE SOLD, Cheap, Three Telescopic GASHOLDERS, two 60 ft. diameter and 20 ft. deep each lift, and one 70 ft. in diameter and 20 ft. deep. Only been in use eight years. May now be seen at work at the Effingham Street Gas-Works, Sheffield.

For price, apply to THOMAS PIGGOTT AND CO., Spring Hill, BIRMINGHAM.

NOTICE TO MANAGERS OF GAS COMPANIES.

THE LAW UNION FIRE AND LIFE INSURANCE COMPANY, of No. 126, Chancery Lane, London, grants Policies of Insurance on Gas-Works, and Buildings connected therewith, which cover risk of explosion and spontaneous ignition of Coal, on very advantageous terms. Full particulars will be sent post free on application to

FRANK M'GEDY, Secretary.

126, Chancery Lane, London.

THE Directors of the Colchester Gas Company invite TENDERS for the Purchase of a Single GASHOLDER, 52 ft. in diameter 18 ft. deep, with Brick Tank, now in use on their Works; the same to be removed within one month after receiving notice that their tender is accepted.

Further particulars may be obtained on application to the undersigned, to whom offers are to be sent not later than Jan. 6, 1880.

By order,
JOHN F. BROWNING,
Resident Engineer and Manager.

Hythe, Colchester, Dec. 19, 1879.

THE Gloucester Gas Company, ceasing to manufacture gas at their old works, will have the undermentioned APPARATUS for Sale about the beginning of August, viz.:—

110 Mouthpieces, D-shape, 13 in. by 22 in., with Wrought-Iron Lids, Cross-Bars, Stand, Bridge, and Dip Pipes. Also about 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. 28 Mouthpieces, D-shape, 16 in. by 20 in., with Wrought-Iron Lids, Cross-Bars, Stand, Bridge, and Dip Pipes. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12 in. Slide-Valves and 12 in. Connections.

Scrubber (round), 5 ft. by 20 ft., with three 12-in. Slide-Valves, and 12 in. Connections.

Exhauster (Jones) to pass about 15,000 feet per hour.

Exhauster (Beales) to pass about 25,000 feet per hour.

Two Vertical Steam-Engines, each about 6-horse power, with Pulleys, and Shafting used for driving the above.

Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.

4-horse power Horizontal Steam-Engine.

Three 4-in. Pumps, with cranked Shafting and a pair Mitre Wheels.

Set of four Purifiers, 12 ft. by 12 ft. by 4 ft., with 12-in. Centre-Valve (Cockeys), and Connections and Lift complete.

Station-Meter by A. Wright and Co., London, with three 12-in. Slide-Valves, and 12-in. Bye-Pass and Connections, to pass about 25,000 feet per hour.

Gasholder, Double Lift, with Cast-Iron Tank, capacity 37,000 feet.

Gasholder, Double Lift, capacity 100,000 feet.

Gasholder, Double Lift, capacity 240,000 feet.

Two 12-in. Governors, by Wright, London, with 12-in Valves, Bye-Pass, and Connections.

Two 12-in. four-way faced Valves, by Cockey.

For further information, &c., apply to the undersigned.

R. MORLAND, Engineer.

THE Oporto Gas Company invite Tenders for the Supply of 10,000 Tons of GAS COALS, free on board, Thames or Tyne; such Coals to be of the following description, viz.:—New Pelton, Pelton Main, Dean's Primrose, West Pelaw Main, Holmside.

The Contractor to state for which Coals he tenders, as none others than those specified will be received.

The Coals are to be put on board as follows:—About 1000 tons in each one of the months of March, April, May, June, and July of 1880, and the remainder in the months of August and September, 1880.

The tenders will be received until the 15th of January next.

The Company will not entertain any conditional tender, or be bound to accept the lowest or any tender.

(Signed) FRANCISCO PINTO DE MIRANDA.

Porto, Dec. 10, 1879.

THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the Supply of OXIDE OF IRON, suitable for purification purposes, to their Gaythorn and Rochdale Road Works, in such quantities as may be from time to time required during Twelve months, commencing next spring.

Forms of tender and full particulars can be obtained upon application to Mr. George B. Jackson, Town Hall, Manchester.

Tenders, endorsed "Tender for Oxide of Iron," and addressed to the Chairman of the Gas Committee, must be delivered here not later than Wednesday, Jan. 1 next.

The Corporation do not bind themselves to accept the lowest or any tender.

By order,
Jos. HERON, Town Clerk.

Town Hall, Manchester, Dec. 16, 1879.

NEW WINDSOR URBAN SANITARY AUTHORITY.

TO COAL MERCHANTS.

THE above Authority are prepared to receive TENDERS for the Supply of best Welsh STEAM COAL, to be delivered at the Sewage Works of the Authority, situate on the Ham at Old Windsor.

It is estimated that about five tons per week will be required, but this quantity may be exceeded. The tenders to state the price per ton of 20 cwt., and the name of the pit from which the Coal will be obtained.

The Authority are also prepared to receive TENDERS for the Supply of FINE COAL or SCREENINGS, to be delivered at the Sewage Works in such quantity as from time to time may be required.

It is estimated that about two tons per week will have to be supplied.

Tenders to be sent to the Office of the Clerk to the Authority, 1, Sheet Street, Windsor, on or before Tuesday, the 30th inst., marked "Tender for the Supply of Coal."

The Authority do not bind themselves to accept the lowest or any tender.

The person whose tender shall be accepted (if any) will be required to enter into a contract with the Authority to furnish a satisfactory supply of Coal, in accordance with the terms of his tender and this advertisement, during a period of Twelve calendar months from the date of the acceptance of the tender.

CHAS. THOS. PHILLIPS, Clerk.

1, Sheet Street, Windsor, Dec. 12, 1879.

"TANNIC GELATINE,"

FOR

REMOVING AND PREVENTING INCRUSTATION OF EVERY DESCRIPTION OF STEAM BOILERS; ALSO CORROSION.

Manufactured only by

WILLIAM RICHARDSON,

GAS ENGINEER,

94, CHARLES HENRY STREET, BIRMINGHAM

BOROUGH OF OVER DARWEN.

TO IRONFOUNDERS, &c.

THE Gas and Water Committee of the above Corporation invite TENDERS for all the Turned and Bored Cast-Iron SOCKET-PIPES required for gas and water purposes, from Jan. 1 to Dec. 31, 1880. Particulars and forms of tender may be had from the undersigned.

Tenders to be addressed C. Costeker, Esq., Town Clerk, Darwen, on or before Saturday, Jan. 3, 1880.

THOS. DUXBURY, Manager.

Darwen, Dec. 20, 1879.

THE Directors of the Kildwick Parish Gas Company are desirous of receiving TENDERS for the Surplus TAR and AMMONIACAL LIQUOR produced at their Works for One, Two, or Three years, from the 1st of January next. The Tar and Liquor will be delivered free on to the Midland Railway, at Kildwick, in the Contractor's tanks, and to be paid for monthly.

Further information can be obtained on application at the Company's Office at Kildwick, where the tenders are to be sent in on or before the 5th of January.

The Directors do not bind themselves to accept the highest or any tender.

JOHN GARLICK, Manager and Secretary.

Gas Offices, Kildwick, *via* Leeds, Dec. 16, 1879.

THE Directors of the Slough Gas and Coke Company are prepared to receive TENDERS for the Supply and Erection of an ANNULAR CONDENSER, a SCRUBBER, and a PURIFIER, and for Re-erecting a METER and GOVERNOR, with all the necessary Pipes, Connections, and Valves, as shown in drawings, &c.

Drawings, specification, and conditions of contract, may be seen at the Office of the Company, No. 1, Chandos Street, Slough, Bucks, between the hours of Ten and Four.

Tenders to be delivered at my Office on or before Monday, Jan. 12 next, addressed to the Chairman, and endorsed "Tender for Condensers, &c."

The Directors do not bind themselves to accept the lowest or any tender.

ARTHUR THOMAS, Secretary.

1, Chandos Street, Slough, Dec. 20, 1879.

CITY OF HEREFORD.

TO PIPE FOUNDERS.

THE Gas Management Committee of the above Corporation invite TENDERS for the Supply and Delivery at their railway siding of the following:—

630 yards of 8-in. Cast-Iron Pipes.
1170 " 6-in. " "
600 " 5-in. " "
800 " 4-in. " "

To be cast vertically in dry sand, with Turned and Bored Spigot and Socket Joints, and coated with Dr. A. Smith's patent Solution.

Tenders, sealed and endorsed "Tender for Pipes," must be delivered at the Office of the undersigned, on or before the 5th day of January next.

The said Committee do not bind themselves to accept the lowest or any tender.

By order,
WILLIAM DAVIS, Engineer.

Gas Office, Commercial Road, Hereford, Dec. 9, 1879.

GAS LIGHTING IMPROVEMENTS.

GEO. BRAY & CO.'S NEW PATENT LANTERNS.

See Page 994.

W. PARKINSON & CO.,

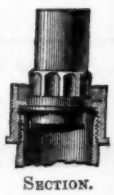
SOLE AGENTS FOR

FOULGER'S PATENT SEAL UNIONS,

As Supplied to The Gaslight and Coke Company.

These Unions practically place a Gas Company's property under lock and key, by rendering it impossible to disconnect at any joint at which gas could be obtained unregistered, without destroying the Company's Seal.

In fixing the Union, a small quantity of crushed sealing-wax is placed in the cup, and being melted with a blow-pipe, the wax runs between the flutings; the circular tong-shaped die will then give a sharp impression of the Gas Company's title, the whole operation requiring about two minutes to perform.

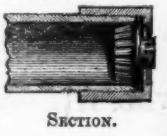


SECTION.

The Unions are supplied in all sizes, either as Caps and Linings, or Barrel Unions, and at a small additional cost over existing connections.

FOULGER'S PATENT SEAL CUTTING-OFF CAPS

Prevent the possibility of obtaining gas when the meter is removed without breaking the Company's Seal. A plug is inserted in the service-pipe, and made gas-tight with a little putty. The cap having been previously filled with sealing-wax is then screwed on to the pipe until the top of the plug projects slightly beyond it. The wax is then warmed with a blow-pipe, and the Company's Seal affixed, thus rendering the pipe perfectly secure, as any attempt to unscrew the cap immediately destroys the Seal, whereas in the case of the ordinary wrought-iron cap there is no protection whatever.



SECTION.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

JOHN ROMANS, C.E., F.G.S.E.,
CONSULTING GAS ENGINEER
AND
CANNEL COAL FACTOR,
30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in th Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c.,
COTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.
Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

TO GAS COMPANIES.
GEORGE McKAIG,
MANUFACTURER OF
GAS-PURIFYING WOOD SIEVES,
153, CLEVELAND STREET,
DONCASTER.

It requires but one trial to prove the Superior Make, Strength, and Durability of these Sieves.

CARRIAGE PAID.

GAS COAL.
THE Tawd Vale Colliery Company, Limited, are prepared to Contract for the Supply of their superior Arley and other GAS COALS, and to send samples to the order of Gas Engineers and others, or complete analysis on application. Shipped at Liverpool, Preston, Fleetwood, Garston, or Birkenhead.
Mr. James Paterson, C.E., F.G.S., in his analysis of T. V. Arley Coal, says: "Some parts merge into a semi-Cannel; Gas per ton, 10,300 cubic feet; illuminating power, 16·96 candles; coke of high quality, 1431 lbs. per ton."
Collieries, Skelmersdale, near Ormskirk; Offices, 5, New Hall, Old Hall Street, LIVERPOOL.

THE
IMPERIAL METER CO.,
LIMITED,
Makers of THE IMPROVED DRY GAS-METERS, THE PATENT WET GAS-METERS, Special Meters for Public Lighting, STATION-METERS, Governors, &c.
KING'S ROAD, ST. PANCRAS,
Formerly also (Walter Ford) at Gray's Inn Road.

EDWARD BROOKE AND SONS,
FIELDHOUSE FIRE-CLAY WORKS, HUDDERSFIELD,
MANUFACTURERS OF
GAS-RETORTS, FIRE-BRICKS, &c.,
Which have been extensively used for 30 years in the construction of Glass Furnaces, where the heat is five times greater than in Gas Ovens; superior to any Retorts or Fire-bricks in the market for standing intense heats, and not contracting.

Less Heat, No Smoke,

White Light, & Economy

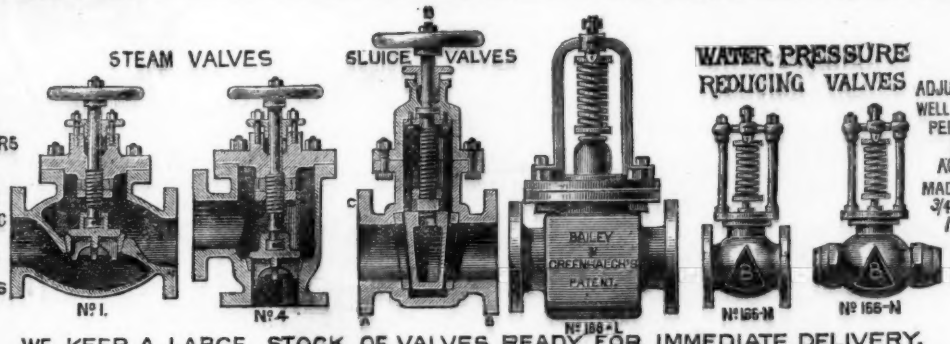
SPECKSTEIN & LAVA
Gas-Burner Fabricants
On the most approved French and German principles.
These Burners can be made to consume from 1¼ feet to 20 feet of gas per hour, and to give a light from 4 to 150 candle power.
Terms and Discount on application.
Catalogue, 6d. Sample Burner, 1s.
AUGUSTUS WESTWOOD & Co., COMMERCIAL CHAMBERS, WEST BROMWICH.

J. & H. ROBUS,
BUILDERS AND CONTRACTORS
FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,
RETORT-SETTING—A SPÉCIALITÉ.
ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.
ESTIMATES GIVEN FOR MAIN-LAYING.
N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.
Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E.

G. E. TOURNAY,
RETORT-SETTER,
CONTRACTOR FOR THE ERECTION OF
Chimney Shafts, Retort Ovens, &c.,
ST. MARY'S STREET, WINCHEAP,
CANTERBURY.

First-Class Testimonials.

ECONOMY IN THE PRODUCTION OF GAS.
PLUTONIC CEMENT,
FOR JOINTING AND REPAIRING RETORTS AND OVENS *in* ACTION AND *out* OF ACTION.
A Pamphlet on the advantages of the above, with Modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,
WILLIAM RICHARDSON, Gas and Hydraulic Engineer, CHARLES HENRY STREET, and BISSELL STREET, BIRMINGHAM.

STEAM VALVES
SLUICE VALVES
WATER PRESSURE REDUCING VALVES
VALVES
RECORDERS
GAUGES
STEAM PUMPS
HYDRAULIC LIFTS
BRASS & IRON COCKS


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ADJUSTABLE WELL MADE PERFECT IN ACTION MADE FROM ¾ IN. TO 15 INCHES BORE
BAILEY AND GREENWALGH'S Patent REDUCING VALVES FOR WATER PRESSURE, with or without Flanges in Iron or Brass.
WE KEEP A LARGE STOCK OF VALVES READY FOR IMMEDIATE DELIVERY.
W. H. BAILEY & CO., Valve and Cock Makers, General Brass Founders for Gas and Water Works, ALBION WORKS, SALFORD, MANCHESTER.

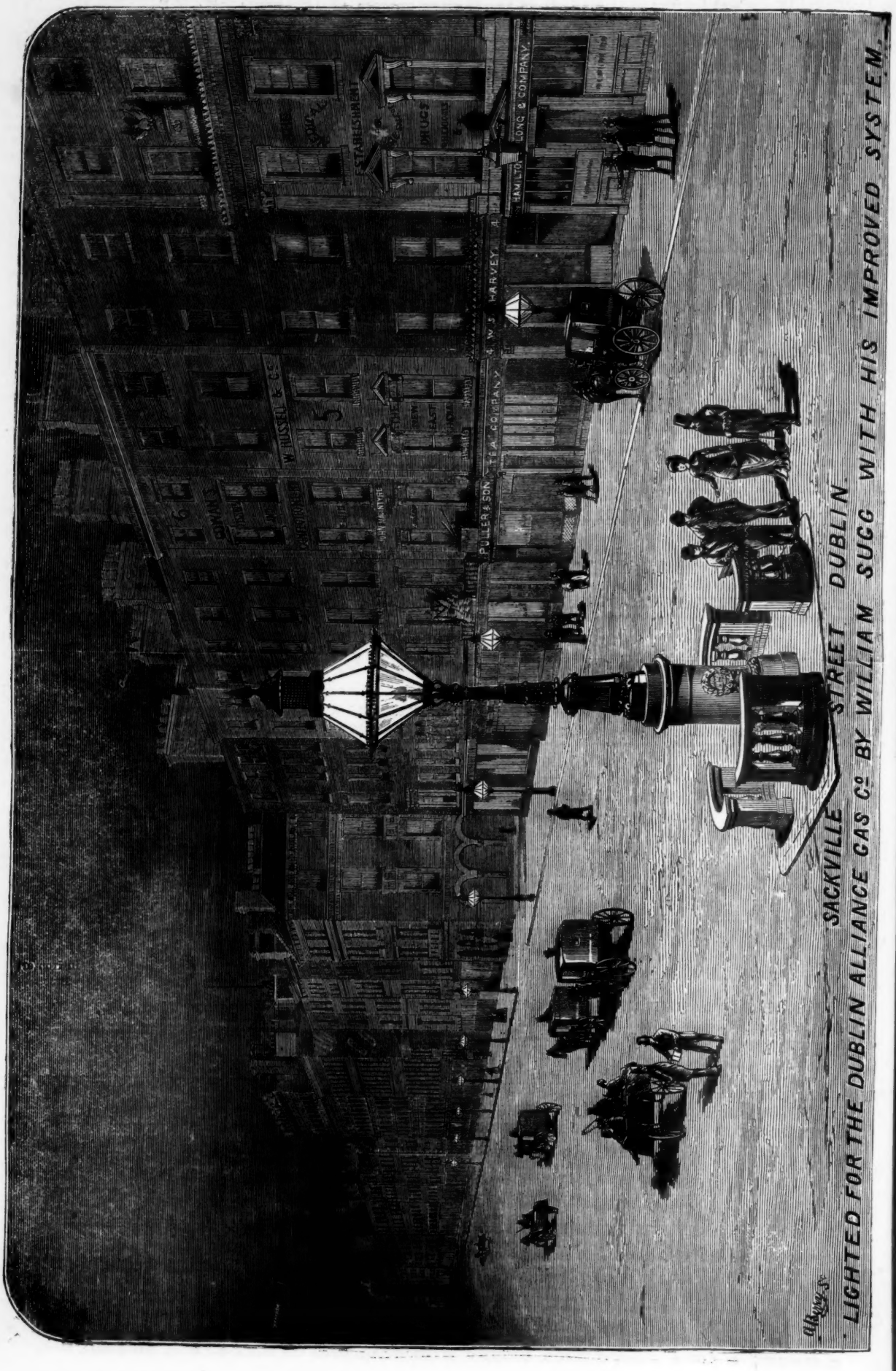
SAMUEL CUTLER & SONS,
CONTRACTORS FOR GAS & WATER WORKS, GENERAL ENGINEERS, IRONFOUNDERS & MANUFACTURERS OF
GASHOLDERS, TANKS, PURIFIERS,
SCRUBBERS, VALVES, EXHAUSTERS, IRON ROOFS, BRIDGES, BOILERS, AND GENERAL CAST AND WROUGHT IRON WORKS.

S. C. & Sons undertake the entire erection of New, or Remodelling of existing Gas-Works in any part of the World, including small Works for MANSIONS, FACTORIES, &c., or Works of the largest extent (are now constructing the largest Gasholder yet erected); also the supplying and laying of MAINS.
They make a speciality of supplying every requisite whatever for Gas-Works, keeping in Stock what are most in request. WOOD SIEVES for Purifiers and Scrubbers, of a superior make.
SPECIAL CASTINGS to Drawing or Pattern at Shortest Notice.

Manufacturers of MORRIS & CUTLER'S PATENT CONDENSER & CUTLER'S PATENT GAS-WASHER.

DESCRIPTION OF MORRIS & CUTLER'S PATENT CONDENSER.—The Condenser may consist of pipes arranged in tiers, or in any other form most convenient to the site available, each tier being connected with special connections, and containing within same either one or more coils of smaller pipe through which water is passed, being supplied from any convenient source of supply, the water passing in an opposite direction to the gas, so that the coldest water is at the gas outlet. The power of the Condenser can be regulated precisely in proportion to the quantity of water allowed to pass through, which is not in any way contaminated, but simply heated by the hot gas, and advantage can be taken of its being at a high level to carry it to a high-level cistern, from whence it can be used for supply to boiler or any other purpose. The Condenser itself may form the support for a high-level cistern. By an arrangement of valves the water may be shut off, and an air orifice opened, when air will pass through instead of water, or both air and water can be shut off. The power of the Condenser is, therefore, entirely under control. The Condenser may be seen in operation at the Brentford Gas-Works.

For further Particulars, apply to Mr. F. MORRIS, GAS-WORKS, BRENTFORD, or to
S. CUTLER & SONS, PROVIDENCE WORKS, MILLWALL (Near the Steamboat Pier), LONDON, E.


W. MUSSEL & Co.
PULLER & SON
TEA COMPANY
W. S. HARVEY
LONG & COMPANY
HAMILTON
STARES
SACKVILLE STREET DUBLIN.
LIGHTED FOR THE DUBLIN ALLIANCE GAS Co. BY WILLIAM SUGG WITH HIS IMPROVED SYSTEM.

WILLIAM SUGG'S IMPROVED SYSTEM OF STREET LIGHTING,

SUITABLE FOR EITHER COMMON OR CANNEL GAS.

Results obtained in Illuminating Power from WILLIAM SUGG'S 200-candle Burners with Cannel and Common Gas:—

Variety of Gas.	Cubic Feet of Gas burnt per Hour.	Illuminating Power in Sperm Candles burning 120 Grains per Hour.	Number of Candles to which every Cubic Foot of Gas burnt is equivalent.
Common 16-candle	53·4	228	4·25
Cannel 19-candle.	47·3	252	4·76

Joint experiment by—

CHARLES HEISCH, Superintending Gas Examiner to the Corporation of London.

T. N. KIRKHAM, M.I.C.E., F.C.S.

C. MEYMOTT TIDY, M.A., M.B., Professor of Chemistry and of Forensic Medicine at the London Hospital, Medical Officer of Health for Islington, and late Deputy Medical Officer of Health for the City of London.

The Illuminating power of the gas made by this Company, on the 9th inst., was 22·7 standard sperm candles for a consumption of 5 cubic feet per hour, in a Sugg's No. 7 steatite bat's-wing burner. On the same day the following results were obtained from two of Sugg's large new Argand burners:—

FIRST EXPERIMENT.

Burner: Sugg's Argand, with two concentric flames.

Consumption per hour . . . . . 22·2 cubic feet.
Illuminating power . . . . . 103·7 candles.
or 4·67 candles per foot of gas.

SECOND EXPERIMENT.

Burner: Sugg's Argand, with three concentric flames.

Consumption per hour . . . . . 40·8 cubic feet.
Illuminating power. . . . . 208·8 candles.
or 5·12 candles per foot of gas.

I have reason to believe that these are as high, if not the highest results yet obtained per foot of gas from these burners.

(Signed) WILLIAM KING,
Liverpool United Gaslight Company,
Liverpool, April 16, 1879. Engineer's Office, Duke Street.

[See JOURNAL OF GAS LIGHTING, April 22, 1879.]

Sugg's 200-candle burner, with 42·09 cubic feet of 20·85-candle gas, gave an illuminating power of 231·56 candles.

Same quality of gas as used at Westminster Bridge, and Waterloo Place, Regent Street.

(Signed) A. C. M'MINN,
Engineer to The Gaslight and Coke Company,
June 16, 1879. Kensal Green Station.

SUGG'S ARGAND, WITH THREE CONCENTRIC RINGS.

Illuminating Power of Gas.	Standard of Comparison.	Gas Consumed per Hour.	Illuminating Power.	Illuminating Power per Cubic Foot.
		Cubic Feet.		
21 candles .	5-ft. London burner . .	45	220·5	4·9
		43	210·0	4·88

(Signed) J. R. FRITH,
Engineer, Runcorn Gas Company.

The following have been selected from a number of similar letters recently received:—

Reading, Nov. 12, 1879.

Your 200-candle Burner with Shadowless Lamp, erected here some months since, in the centre of four cross-roads, continues to give the greatest satisfaction, both to the public authorities and to this Company.

Before the Lamp was erected, several tests were made as to the real cost per hour (once in the presence of the Medical Officer of Health, Dr. Shea, who is the Gas Examiner for Reading), and from an average of these tests, we found that the best rate of consumption was at 52 feet per hour, and we had not the slightest reason to doubt that the Burner gave considerably over 200-candle power. I need scarcely refer to the beauty of the light, and while such street lighting can be effected at so small a cost, there is not much fear of electricity taking its place.

(Signed) EDWARD BAKER,
Engineer and Manager,
Reading Gas Company.

Dublin, Oct. 31, 1879.

In reply to your inquiry, I beg to say that your new reflecting Street-Lamps, which we have erected in Sackville Street, are giving the greatest satisfaction. They are greatly admired not alone for their beauty, but also in consequence of the Argand burner emitting a soft light, which is reflected with an entire absence of shadow. I have calculated that each of these lamps gives as much light as eight of the ordinary Street-Lamps.

(Signed) W. F. COTTON,
Secretary and Manager,
Dublin Alliance Gas Company.

Salford, Oct. 28, 1879.

In answer to your inquiry, I may state that we have three of your large Burners and Lanterns in use in Salford, each of which consumes 48 feet of gas per hour, and yields a light equal to 230 sperm candles. This is equal to 4·9 candles for every foot of gas consumed, *a larger amount of light than yielded by any other Burner.* An important point is that the Lanterns are so constructed that there is an entire absence of shadow.

(Signed) SAMUEL HUNTER, Assoc. I.C.E.
Engineer and Manager,
Salford Corporation Gas-Works.

Keighley, Oct. 31, 1879.

Our Committee being desirous of lighting certain positions in the town in a more effectual manner, requested me to fix one of your 200-candle Burners and improved Lanterns . . . . the object being to test the relative efficiency of different systems. The lamps were erected a few weeks since, when yours conveyed at once more favourable impressions. . . . Since that I have made a number of tests, and the favourable impressions yours made have been more than realized.

I may say that our Committee are so satisfied with your system that they have decided, when such lights are required, to adopt yours.

(Signed) JOHN LAYCOCK,
Engineer and Manager,
Keighley Gas-Works.

Blackburn, Nov. 27, 1879.

I have much pleasure in saying that for brilliancy and style I have never seen anything to equal your lamps. We have twelve 50-candle burners, two 80-candle, and one 200-candle in use, and after the Lamp Committee had inspected them, they were so highly pleased that they have resolved to erect similar lamps in all the public squares and crossings.

(Signed) S. R. OGDEN,
Engineer and Manager,
Blackburn Corporation Gas-Works.

PRICES AND PARTICULARS ON APPLICATION TO

WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, WESTMINSTER, S.W.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
FINSBURY CIRCUS, LONDON.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

ESTABLISHED IN 1860.
BENJAMIN CARPENTER,
THE ORIGINAL MANUFACTURER OF THE IMPROVED
WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.

PROVIDENCE WORKS,
22, HERMES STREET, PENTONVILLE ROAD,
LONDON, N.

The Dunston Engine Works Co.,
GATESHEAD-UPON-TYNE.
Are the Sole Manufacturers of
Archer's Patent Hoists,
ALSO OF
Archer's Patent Stone Breaker,
AND OF
Archer's Patent Ore Crusher & Pulveriser,
The last-named Machine (without the Pulveriser) makes the best and most durable Coke Breaker.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

ASBESTOS,
INDESTRUCTIBLE FUEL FOR GAS-FIRES.

REDUCTION IN PRICES.

Apply for Price List and Samples to the Original Manufacturer,

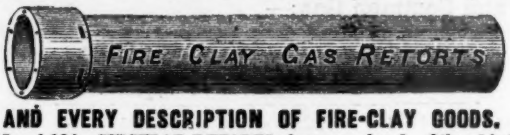
THOS. REYNOLDS,
100, ASTON ROAD, BIRMINGHAM.

Gold Medal Awarded, Paris Exhibition, 1878.

THOMAS TURTON AND SONS,
SHEAF AND SPRING WORKS,
SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS,
STEEL OF ALL DESCRIPTIONS,
SCREW STOCKS, TAPS, AND DIES, SPANNERS, RATCHET BRACES, LIFTING-JACKS, ANVILS, VICES,
AND ENGINEERS TOOLS GENERALLY.
LONDON OFFICE:
90 CANNON STREET, E.C.

GEORGE ORME & CO.,
ATLAS METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
STATION-METERS, GOVERNORS,
PRESSURE AND EXHAUST REGISTERS,
LAMP-METERS IN CAST-IRON BOXES,
And every Description of Gas Apparatus.

JOHN HALL AND CO., STOURBRIDGE,
Manufacturers of FIRE-BRICKS, LUMPS, TILES,

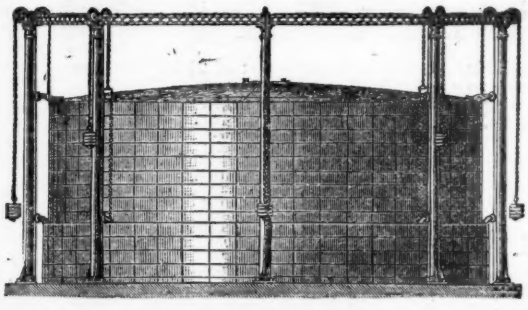


AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

LONDONDERRY GAS COALS
DIRECT FROM THE
MARQUESS OF LONDONDERRY'S COLLIERIES.
COUNTY OF DURHAM.
For Prices and Particulars, apply to
MR. S. J. DITCHFIELD,
LONDONDERRY OFFICES, SEAHAM HARBOUR, COUNTY OF DURHAM.
London Agents: Messrs. LAMBERT BROS., 85, GRACECHURCH ST., E.C.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.

STATION-METERS GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,
And every description of Gas-Fittings and Gas Apparatus.

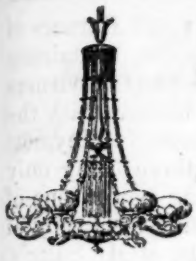


J. T. B. PORTER & CO.,
GAS ENGINEERS & MANUFACTURERS,
IRONFOUNDERS AND CONTRACTORS,
GOWTS BRIDGE WORKS,
LINCOLN.

LONDON OFFICES: 1, WESTMINSTER CHAMBERS, S.W.

ESTIMATES FOR GAS-WORKS OF ANY SIZE.
REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—All Communications to be addressed to the FIRM ONLY.



F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

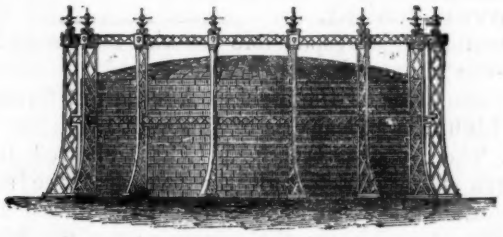
ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY.

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

WHITEFRIARS STREET, FLEET STREET, LONDON, E.C.,

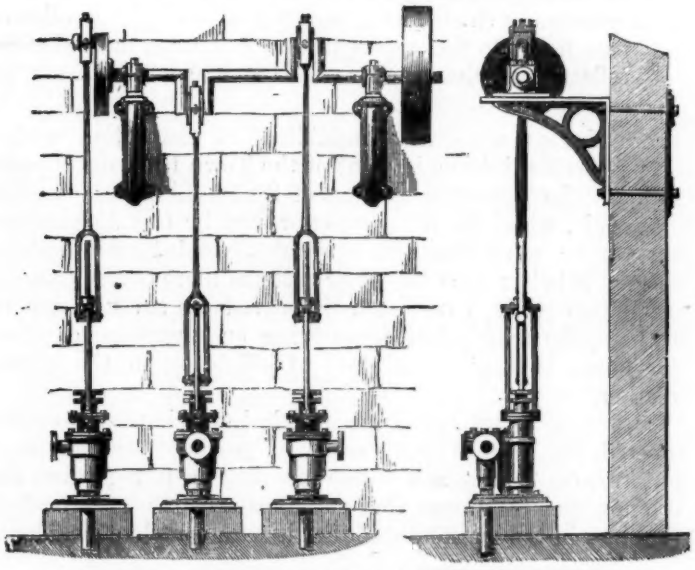
Hydraulic Engineers,

AND MANUFACTURERS OF

PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

BLAKE'S PATENT DIRECT-ACTING STEAM-PUMPS.



IMPROVED DOUBLE-ACTION PUMPS.

For Water. For Tar. For Ammoniacal Liquor.

This illustration shows an arrangement of three (No. 179) Improved Double-Action Pumps driven from the same crank-shaft, as frequently supplied for use in Gas and Chemical Works. The suction and discharge pipes can be arranged for drawing from and delivering in any required direction

These Pumps have been supplied to nearly all the large Gas Companies and Chemical Works, both for Pumping Water, Tar, and Ammoniacal Liquor.

GAS SYPHON PUMPS, IN COPPER OR SHEET IRON, ALWAYS IN STOCK.

Illustrated Catalogues sent post free on application.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

Prices are Reduced.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their VALUE.

Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

JAMES NEWTON & SONS,

(Established 1820,)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

TORBAY AND DART PAINT COMPANY, LIMITED.

WORKS:

DARTMOUTH & BRIXHAM (TORBAY) DEVON.

OFFICES:

23, GREAT GEORGE STREET, WESTMINSTER LONDON, S.W.

SOLE PROPRIETORS AND MANUFACTURERS OF

WOLSTON'S CELEBRATED

TORBAY IRON PAINTS.

TRADE MARK

These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
Dart Yellow.	Buff.
Brixham Black.	Torbay Chocolate.
Light Blue.	Cream Colour.
Dart Brown.	Dart Umber.
Imperial Stone.	Light Stone.
Bronze Green.	Salmon Colour.
Navy Green.	Lead Colour.
Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
Light Green.	Iron Grey.

All other Colours made to order.

READY-MIXED PAINTS.

A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

Prices and Testimonials on application.

NOTICE.—With regard to an advertisement, having reference to Street-Lamps and Burners of large lighting power, which appeared in this JOURNAL of Nov. 4, and some time previous, containing the statement that "comparative experiments . . . . . conclusively prove that the 'Sugg' burners give over 30 per cent. of illuminating power more than can be obtained from any other burners with the like quantity of gas," which statement purports to be based on a report given by Messrs. C. Meymott Tidy, M.A., M.B., T. N. Kirkham, M.I.C.E., F.C.S., and Charles Heisch, F.C.S., and there being only two Makers in the market, besides Mr. Sugg, of burners and lanterns of large lighting power, one of whom is ourselves, we think it right to state that, having written to these gentlemen asking for a copy of their report, they reply that they are unable to furnish us with one, as it was a private one of Mr. Sugg's, and two of the gentlemen inform us that **not only were our burners not mentioned in the report, but that they were not even tested.**

The names of the above eminent scientists being made responsible for the statement here quoted gives it an importance it would not otherwise possess; hence the above notice.

We may also state that the report of the Committee of the British Association formed to inquire as to "The Best Means for the Development of Light from Coal Gas of Different Qualities," comprising Dr. Wm. Wallace, Professor Dittmar, and Mr. Thos. Wills, F.C.S., F.I.C.E., showed that **Bray's Burners yielded the greatest amount of light,** of all the two or three score burners reported upon (which included all burners of repute in the market), and had the fewest defects—such as "smokes," "blows," &c.—recorded against them; and were the lowest in price. The report was presented at the meeting in 1878, and was the most exhaustive ever prepared on the subject.

STREET-LIGHTING IMPROVEMENTS.

BRAY'S
PATENT LANTERNS & FLAT-FLAME BURNERS
Of 30 to 200 CANDLES POWER.

This Apparatus has the following merits, viz.:—

The Burners are of the flat-flame type, which is the only practicable type for Street-Lighting purposes.

Their lighting power is greatly in excess of Flat-Flame Burners made prior to the introduction of these, and, the up and down light being taken into account, it is in excess of that yielded by any Burners, Flat-Flame or otherwise.

The flame in the lantern is remarkable for its steadiness, whiteness, and brilliancy.

The lantern is storm-proof, its efficiency not being materially affected in a gale of wind.

It is practically shadowless, though the top light is allowed to pass freely to the upper parts of buildings, instead of being reflected, in the main, round the base of the lamp, as in some systems.

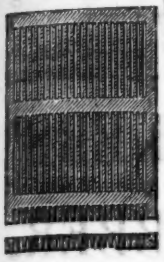
These Lamps were first exhibited in connection with the Leeds Gas Exhibition, in front of the Town Hall, in conjunction with all the improved systems of Street Lighting now before the public, when the opinions expressed by Gas Engineers and the Public were that this apparatus yielded more light and diffused it better than the other systems there tried. Since this Exhibition they have been improved in several important features, the principal of these being an arrangement whereby the flame is kept in a state of efficiency in the stormiest weather.

So long as we could see any desirable improvement to be effected, we have avoided, as far as possible, sending out our lanterns, or making any public announcement regarding them. We now feel convinced that our apparatus is nearer perfection than any in the market, and offer it with complete confidence.

Price and Particulars on application to

GEO. BRAY & CO.,
GAS-LAMP & "ENAMEL" BURNER MANUFACTURERS,
LEEDS.

R. DEMPSTER AND SON'S



WOOD SIEVES FOR PURIFIERS,

WITH TAPER OR PARALLEL BARS,

MADE BY SPECIAL MACHINERY.

SCRUBBERS FILLED WITH BOARDS,

On our approved principle, for the extraction of Ammonia.

Prices on application. References to First-Class Engineers.

ROSE MOUNT IRON-WORKS,

ELLAND, NEAR HALIFAX.

LONDON OFFICES: 2, SUFFOLK LANE, CANNON STREET, E.C.

GAS *v.* ELECTRIC LIGHT.

WIGHAM'S PATENT GAS-BURNERS

FOR

STREET LIGHTING, &c., WHICH REQUIRE NO GLASS CHIMNEY.

Speaking of these burners, erected on the Thames Embankment, the Governor of The Gaslight and Coke Company, at the half-yearly meeting, Aug. 15, 1879, says:

"Any gentleman who may wish to see the light, may do so at the foot of Westminster Bridge, where it is in direct contiguity with the electric light, so that he will be able to judge for himself. There is a light there that completely excels the electric light in the intensity of its illumination, and in the scope of its diffusion. The lamps on Westminster Bridge are some of Mr. Wigham's."

SOLE MANUFACTURERS:

J. EDMUNDSON & CO., GAS ENGINEERS,

19, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

J. & J. BRADDOCK,

GLOBE METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY CONSUMERS GAS-METERS,

OF THE HIGHEST EXCELLENCE ONLY;

ROUND STATION-METERS,

ON CAST-IRON STANDS;

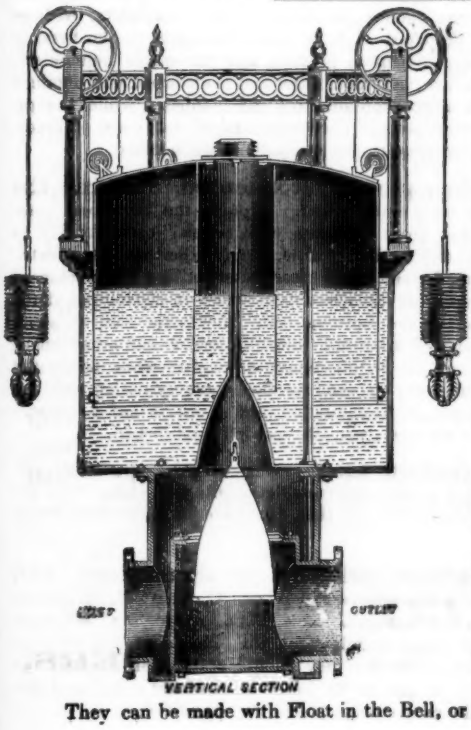
SQUARE STATION-METERS,

WITH PLANED JOINTS.

Messrs. BRADDOCK beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 30-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.

John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity, I have scarcely ever examined a Coal containing so small a quantity of ash and when Cannel of the best description is scarce, it may well replace this material."

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

HENRY LYON,

MECHANICAL AND CONSULTING GAS ENGINEER,

NORWOOD, NORTHENDEN ROAD,

SALE, NEAR MANCHESTER.

SANDELL AND SON,

PUBLIC ACCOUNTANTS,

2, GREAT GEORGE STREET, WESTMINSTER.

SANDELL AND SON having been engaged during the last 25 years in Gas Companies Accounts, either in Preparing or Investigating Statements for Parliamentary Applications, Arbitrations, and otherwise, offer with confidence their Services for similar purposes.

Mr. ROBERT DEMPSTER,

CONSULTING GAS ENGINEER,

ELLAND, near HALIFAX,

May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations is both extensive and reliable.

ALFRED LASS, F.I.Accts.,

SPECIAL ACCOUNTANT FOR GAS AND WATER UNDERTAKINGS,

30, GRACECHURCH STREET, LONDON.

Accounts Analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.

The Forms of Account, which have been specially designed by Mr. Lass to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, Corporations, and Local Boards.

HARPER & MOORES,

PROPRIETORS OF THE

BEST STOURBRIDGE CLAYS,

STOURBRIDGE.

Manufacturers of all Descriptions of

BEST STOURBRIDGE FIRE-BRICKS, LUMPS, AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

ESTABLISHED 1836.

The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture. SILVER MEDAL, PARIS, 1878.

TO MAKERS OF SULPHATE OF AMMONIA AND BUYERS OR SELLERS OF GAS LIQUOR.

F. SUTTON & CO., Norwich, are now prepared to Supply a Set of Apparatus with Standard Test Solutions for the rapid and accurate analysis of Gas Liquor, which can be used by any intelligent workman, so as to show the actual amount of Sulphate which can be got out of any sample of liquor in a few minutes, without any of the annoyance arising from saturation with acid, &c. Tables are also given, showing the quantity of acid of various strengths required for any given liquor, the accurate ounce-strength and percentage of pure ammonia, &c. Price of the set, with full direction and table (copyright), with materials sufficient for fifty analyses, £4 4s.

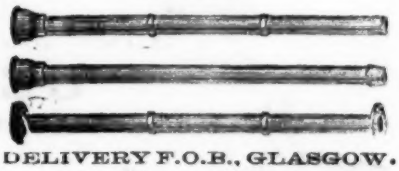
Post orders or cheques to be made payable to F. SUTTON AND CO., Manufacturing Chemists, NORWICH, who also supply every description of Standard Solutions for Volumetric Analysis of Waters, Beers, Manures, &c., of guaranteed accuracy.

GAS AND WATER PIPES.

WILLIAM MACLEOD & CO.,

30, ST. ENOCH SQUARE, GLASGOW.

CAST-IRON GAS AND WATER PIPES.



DELIVERY F.O.B., GLASGOW.

Prices on application

C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the important results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

THE

SILBER LIGHT COMPANY,

MANUFACTURERS OF

SILBER'S PATENT TUBULATED BURNERS

FOR

COAL OR AIR GAS,

And of SILBER'S BAT'S-WING GAS-BURNERS and every variety of Gas-Fittings.

ALSO MANUFACTURERS OF

EVERY DESCRIPTION OF LAMPS (burning Colza Oil, Petroleum, Paraffin, or Kerosene) FOR DOMESTIC PURPOSES, STREETS, RAILWAY STATIONS, SHIPS, &c., &c.

FIG. 1.
Silber's Patent Tubulated Gas-Burner, drawn full size.

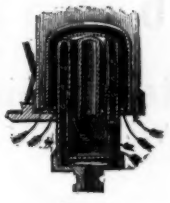


FIG. 2.
Section of Silber's Tubulated Gas-Burner, the arrows indicating the currents of air to the flame —two externally and two internally.

Dr. Wallace, F.R.S.E., Gas Analyst of Glasgow, says of this burner: "It gives the steadiest flame of any Argand yet constructed."

FIG. 3.
Silber's Tubulated Gas-Burner with glass bulb or vase beneath, and with larger inlet than aggregate outlet area, by which means the illuminating power for 5 cubic feet of 16-candle-light gas is increased one candle.

The Silber Tubulated Gas-Burner offers the following advantages over existing Argand Gas-Burners:—

1. It affords more light for 5 cubic feet of gas.
2. It is made of brass, and so put together that there is no liability of its melting, or coming to pieces in any other way, as burners made of soft metal are apt to do.
3. It is capable of burning from 4 to 7 cubic feet of gas per hour (by using chimneys of different lengths), and although the consumption be increased, **the illuminating power per cubic foot of gas remains almost quite constant.**
4. With the glass bulb or vase, as shown in fig. 3, the illuminating power for 5 cubic feet of 16-candle-light gas is **increased one candle.**

FIG. 4.
Silber's Bat's-Wing Gas-Burner.
The results obtained from this Burner are amongst the best obtained from any flat-flame Burners yet introduced.

FULL PARTICULARS & ENGRAVINGS

Forwarded on application to

THE SILBER LIGHT COMPANY,

49, WHITECROSS STREET,

LONDON, E.C.

FIG. 5.
Silber's Bat's-Wing Burner, with Opal Gas Moon.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

HARTHILL CANNEL

Yields 14,920 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

12,530 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 13,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full analyses on application at above address, or from WEDDERSPOON, FERGUSSON AND CO., 21, Lime Street, LONDON, E.C.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

THE

SILICA FIRE-BRICK CO.,

OUGHTIBRIDGE

Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

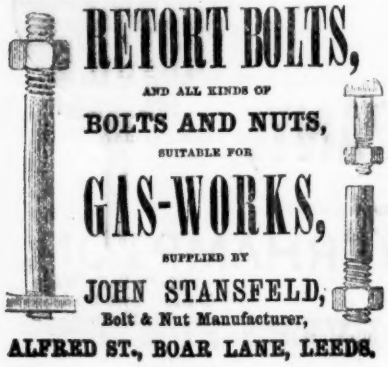
Agent in London, Mr. J. MANWARING, 101 Cannon Street, E.C.

M. BREMOND'S NAPHTHALINE PROCESS.

All negotiations respecting M. Brémond's patented process for preventing Deposits of

NAPHTHALINE

in Gas Main and Service Pipes should be addressed to Mr. W. H. BENNETT, 22, Great George Street, WESTMINSTER, S.W., or to M. BREMOND, Gas Engineer, Compania Madrilena de Alumbrado y Calefaccion por Gas, MADRID, who may be consulted upon all matters connected with the Gas Industry.



RETORT BOLTS,

AND ALL KINDS OF

BOLTS AND NUTS,

SUITABLE FOR

GAS-WORKS,

SUPPLIED BY

JOHN STANSFELD,

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148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL,

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NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

WILSON CARTER AND PEARSON,

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Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

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GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Eighteen Illustrations and Letterpress on the Construction of Gas-Works, post free, 2s. 6d.

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

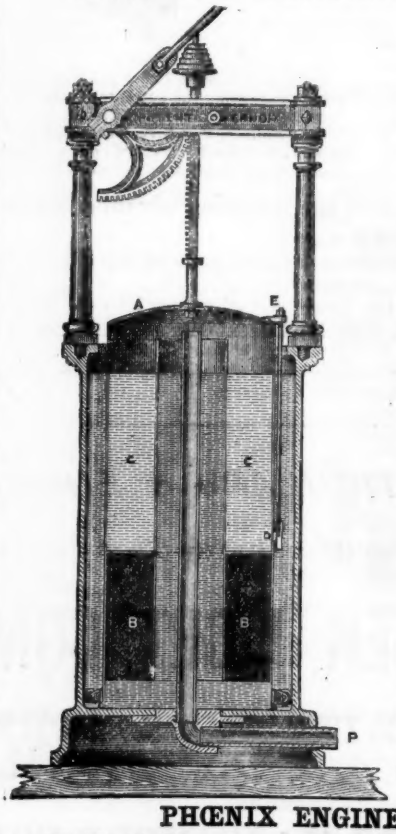
35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

GEORGE WALLER & CO.,

GAS AND HYDRAULIC ENGINEERS,

Patent Compensating Steam Governor,

WITH SELF-CONTAINED WATER-BALANCE.



This is the most efficient and perfect Governor yet made to control and regulate the speed of Engines and Exhausters according to the varying make of gas, and maintain a steady gauge, whether working level or with six inches of seal.

It is the only Governor that will effectually control Condensing and Compound Engines, especially when the Exhauster is on light work, and the Engine is large.

During the drawing and charging of Retorts, the Engine requires no attention—a matter of great importance in small works.

Descriptive Circular sent on application.

They are in use at
BECKTON,
HAMPTON WICK,
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HARTLEPOOL,
RAMSGATE,
SUTTON,
and about 30 other works.

G. W. and Co. make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

See also advertisement, page 987.

PHŒNIX ENGINEERING WORKS,

Holland Street and Bear Gardens, Southwark, S.E.

THE WIGAN COAL & IRON COMPANY,

LIMITED,

DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN,

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

GAS COAL. GAS COAL. GAS COAL.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

Near BARNSLEY.

This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.

PARIS EXHIBITION, 1878.

THREE MEDALS

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HONOURABLE MENTION

HAVE BEEN AWARDED TO

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For their Various Exhibits, amongst which is a

SILVER MEDAL

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RETORTS AND FIRE-BRICKS,

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WORTLEY FIRE-BRICK WORKS,

NEAR **LEEDS,**

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SPECIAL NOTICE.—Our Patent Machine-Made Retorts have now been thoroughly tested, and have proved themselves infinitely superior to those made by hand. At several large works it has been settled, beyond question, that, owing to the compactness and general excellence, more gas is sent to the gasholder from each ton of coal carbonized than is the case with hand-made Retorts.

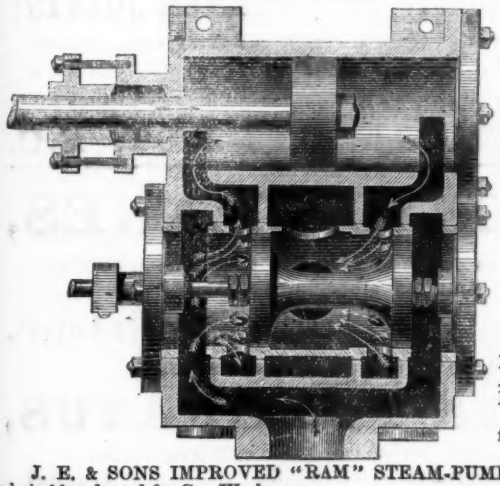
THE "RELIABLE" STEAM-PUMP

IS NOW IN USE AT NEARLY ALL THE

LEADING GAS AND CHEMICAL WORKS THROUGHOUT THE KINGDOM,

INCLUDING

THE GASLIGHT AND COKE CO., BECKTON NEW WORKS (24 supplied),
THE GASLIGHT AND COKE CO., GREAT CAMBRIDGE STREET WORKS, HACKNEY,
THE PHŒNIX GAS CO. and COMMERCIAL GAS CO., LONDON,



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and other Gas-Works.

The "RELIABLE" is undoubtedly, by means of its Piston Valve, the best Pump made for Gas-Works use. It is specially adapted for pumping TAR, OILS, AMMONIACAL LIQUOR, &c., and is the ONLY Pump that will do so SUCCESSFULLY and at the same time discharge double the quantity of liquid. The "RELIABLE" is the only Pump manufactured that is REVERSIBLE, and therefore is invaluable in frosty weather.

J. E. & SONS IMPROVED "RAM" STEAM-PUMPS, which are made with both Single and Double Rams and Steam Cylinders, are also admirably adapted for Gas-Works use.

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MAKERS AND PATENTEES OF

PUMPS AND PUMPING MACHINERY FOR EVERY PURPOSE.

CROLL'S
DRY GAS-METERS,

PRIZE MEDALS.
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COMBINING ALL THE LATEST IMPROVEMENTS,

MANUFACTURED ONLY BY

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THE GAS-METER COMPANY, LIMITED,

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ALEXANDER WRIGHT & CO.,

55, 55a, & 56, MILLBANK STREET, LONDON, S.W.,

MANUFACTURERS OF

WET & DRY GAS-METERS & GAS APPARATUS,

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Which has for years been so extensively employed by Gas Companies and others, at home and abroad, have learned that inferior and imperfect dial papers bearing their name, for use with the above instruments, have been and are being produced for and sold by one or more other firms. The genuine dial papers are printed from plates accurately engraved by machinery, so that the scales are correct, which cannot be the case with the spurious papers mentioned above.

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Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,

THE UNVARYING WATER-LINE GAS-METERS,

IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges, Governors, Test Holders, &c., &c.

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IMPROVED HYDRAULIC CRANES,

Effecting a great saving in the cost of discharging Coals from Vessels, Barges, &c. Several of these Cranes, with the necessary power, are now being erected at Beckton, Hull, and other Gas-Works.

HYDRAULIC APPARATUS for Lifting and Lowering Purifier-Covers.

Sixteen recently erected at Beckton, applied to Covers 30 feet square.

SULPHATE OF AMMONIA APPARATUS,

IN SUCCESSFUL OPERATION AT THE NEW WORKS OF THE NEWCASTLE AND GATESHEAD GAS COMPANY, AND IN COURSE OF ERECTION AT THE CARLISLE CORPORATION GAS-WORKS.

Special "REGULUS COCKS" manufactured to stand Acid.

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London: Printed by WALTER KING, for the Executors of the late WILLIAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street), and published by him at No. 11, Bolt Court, Fleet Street in the City of London.—Tuesday, December 23, 1879.